Dec. 11, 1934. M. AMANN 1,983,960

CURRENT IMPULSE TRANSMITTER

Filed April 30, 1932 4 Sheets-Sheet 1

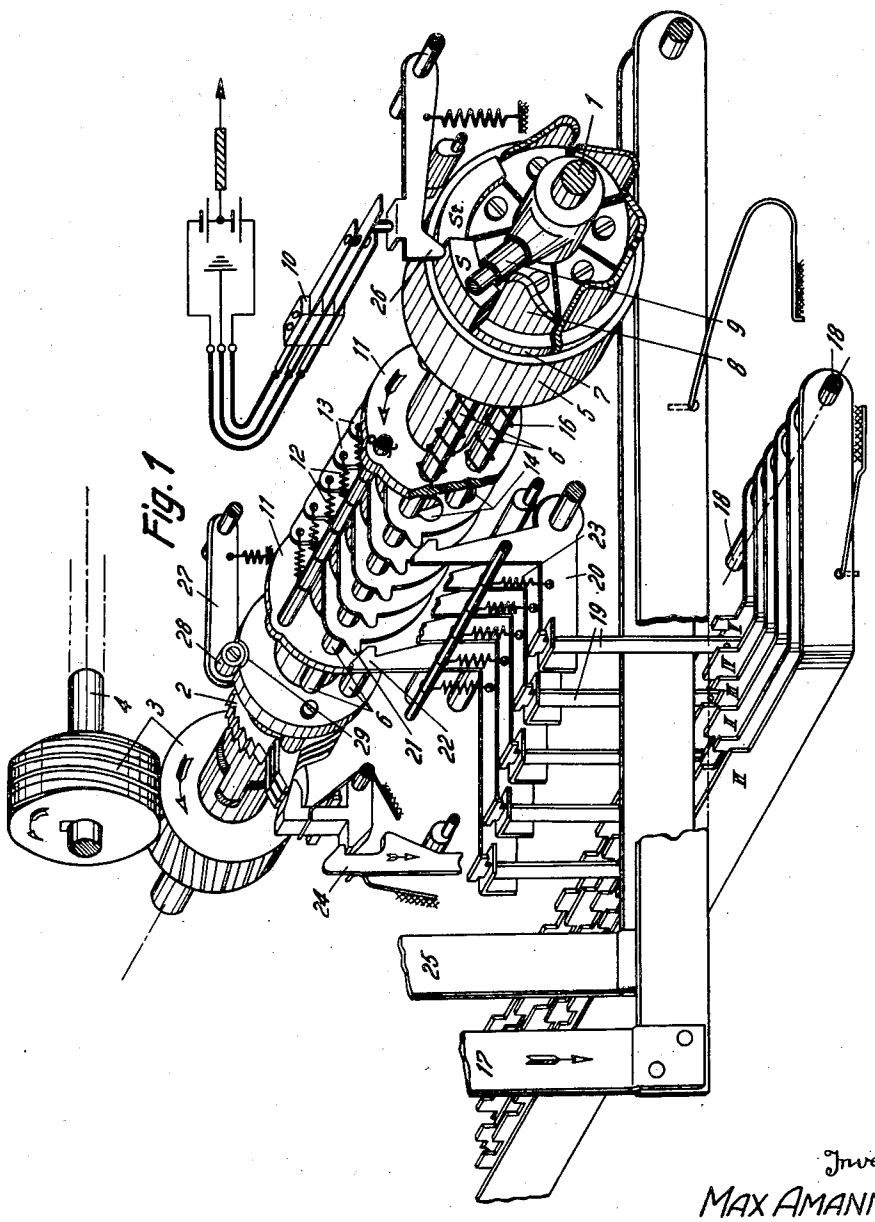


Fig. 1

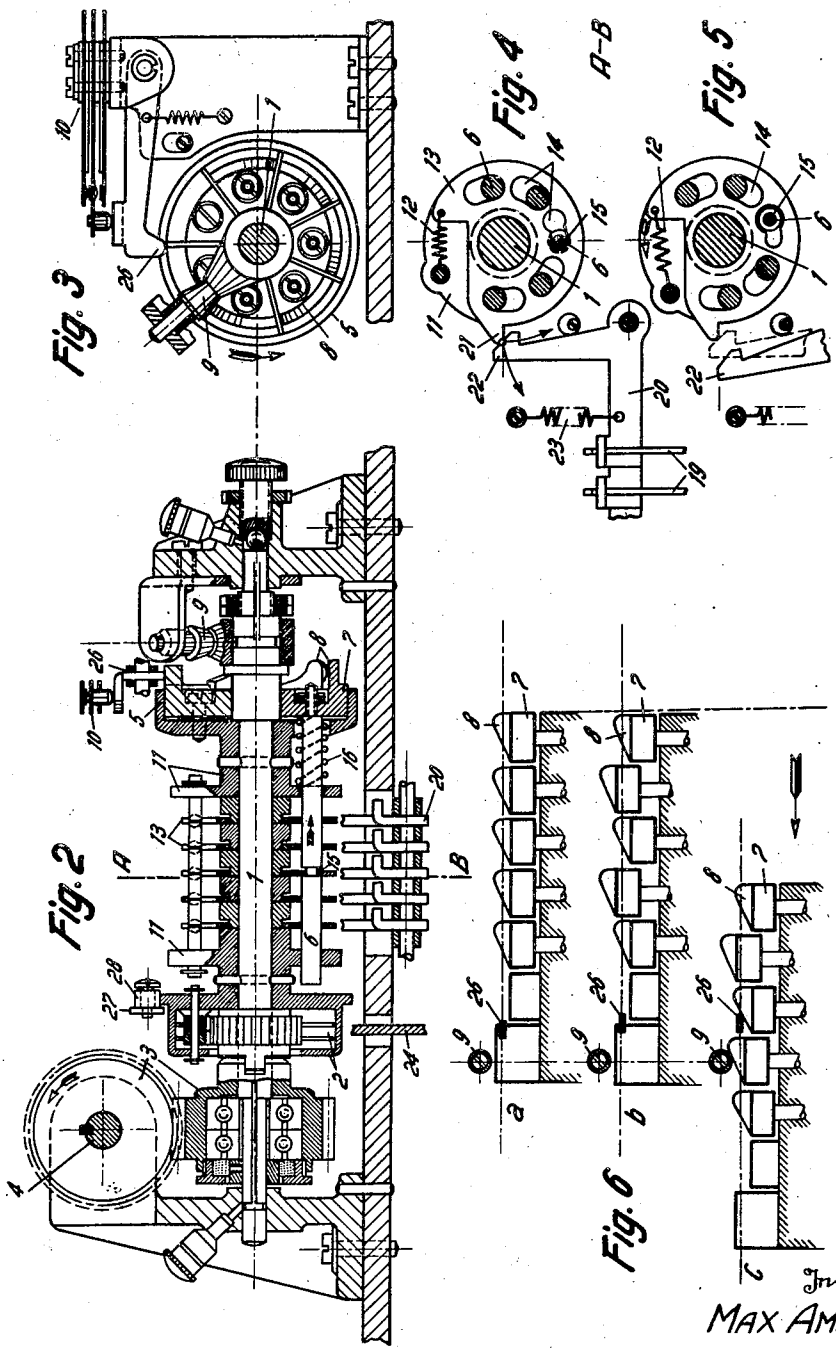
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CURRENT IMPULSE TRANSMITTER

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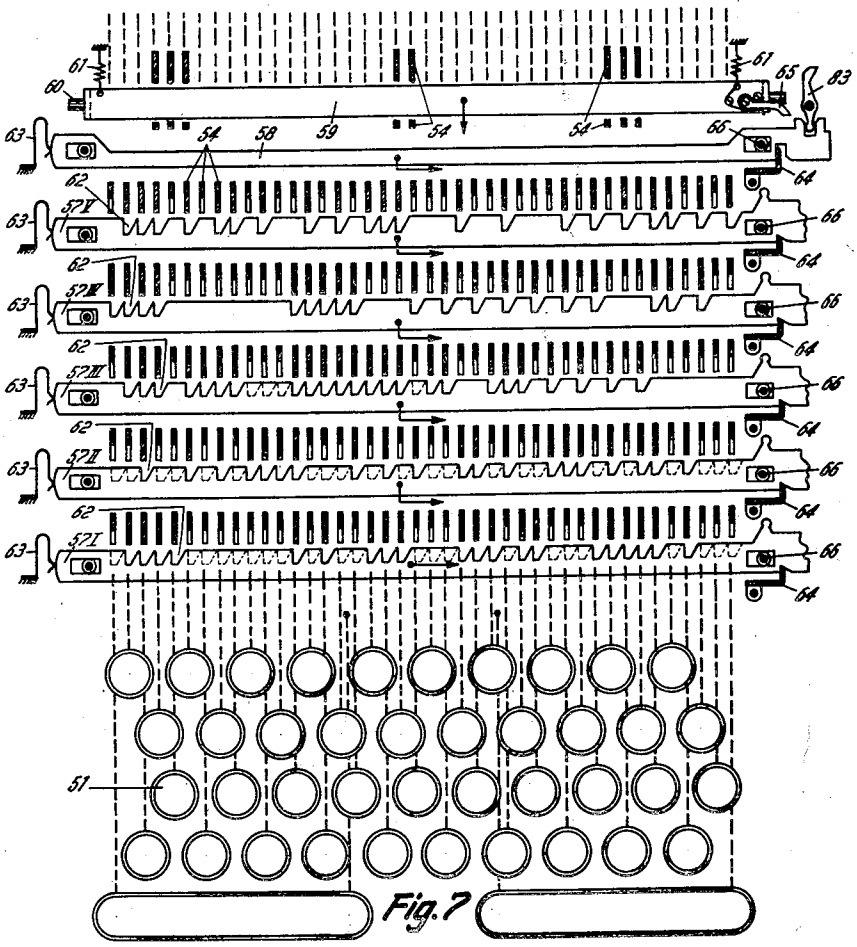


Fig. 7

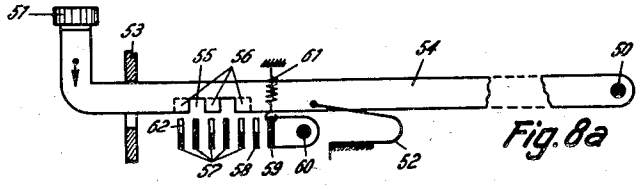


Fig. 8a

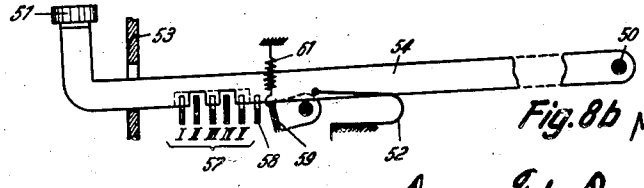


Fig. 8b

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Fig. 10c

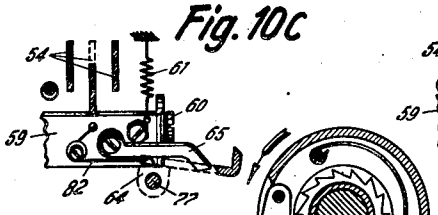


Fig. 9c

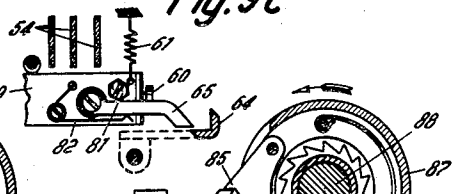


Fig. 10b

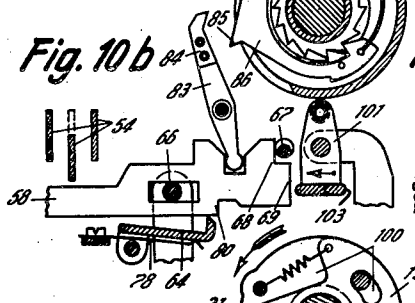


Fig. 9b

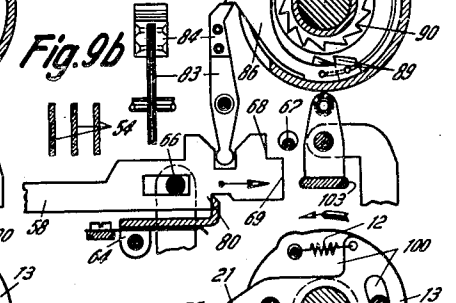


Fig. 10a

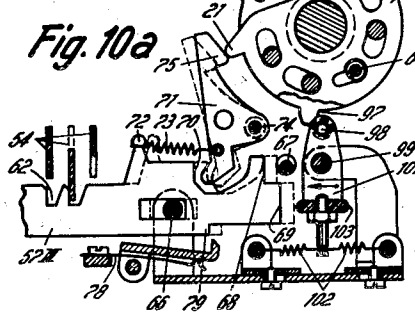


Fig. 9a

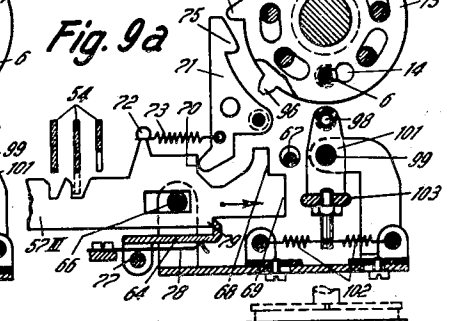
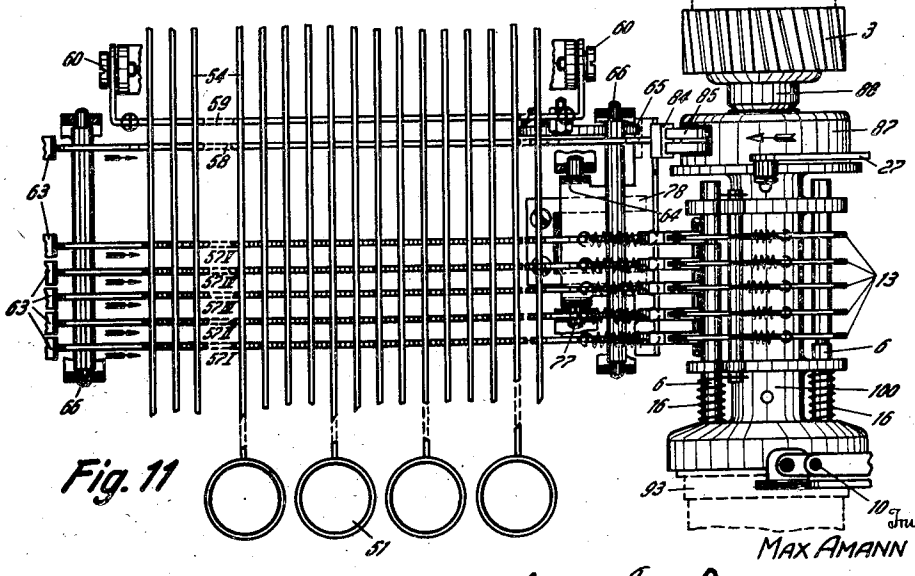


Fig. 11



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UNITED STATES PATENT OFFICE

1,983,960

CURRENT IMPULSE TRANSMITTER

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Application April 30, 1932, Serial No. 608,533
In Germany May 1, 1931

21 Claims. (Cl. 178—79)

This invention relates to current impulse transmitters and more particularly to key board telegraph apparatus, wherein the actuation of one of a number of keys by an auxiliary force causes a corresponding series of current impulses to be transmitted and/or the punches of a perforating device to be connected.

In the known current impulse transmitters of this type, various cams are preparatorily adjusted by actuating a key. During the return movement of the current impulse transmitter under the action of the auxiliary force, the adjusted cams actuate the transmitting contact. In such cases the cams are actuated directly by the keys, so that it is necessary to lock the keys until a series of current impulses has been completely transmitted in order to avoid an overlapping of successive series of current impulses. This locking of the keys leads to uncertainties in operation and forces a slowing down of the operation, since the rapidity of actuating the keys depends upon the duration of the return movement of the current impulse transmitter.

According to this invention, in order to avoid the necessity of locking the keys and to enable the next key to be depressed before the termination of the transmission of a series of current impulses, intermediate members are provided in which the selected series of current impulses is stored up by the actuation of a key. These intermediate members, during the transmission of the series of current impulses, are prevented from influencing the keys and are withdrawn from the influence of the keys.

The invention will however be best understood by description with reference to the accompanying drawings, illustrating two examples of construction in the form of so-called "distributors" for the transmitting apparatus of type printing telegraphs, which transmit series of current impulses according to the five letter alphabet.

In said drawings:

Fig. 1 is a diagrammatic illustration of one form of construction of a current impulse transmitter in its essential parts and in perspective elevation;

Figs. 2 and 3 represent constructional details in side and end elevations respectively;

Figs. 4 and 5 are detail views illustrating the operation when releasing the cams for controlling the contacts;

Fig. 6 is a diagrammatic representation in three views of the conditions during the rest period, at the beginning of the transmission and during the transmission;

Fig. 7 is a diagrammatic representation of the transmitter of another or the second form of construction, wherein the setting bars on which the keys act are shown superposed;

Figs. 8*a* and 8*b* respectively illustrate a section of the key T and the setting bars in rest and operative positions;

Figs. 9*a*, 9*b* and 9*c* and Figs. 10*a*, 10*b* and 10*c* illustrate details facilitating explanation of the method of operation of the arrangement which is shown in Fig. 11, the same being in elevation as a whole; and

Fig. 11 is an elevation of the arrangement embodying said details.

In the first form of construction represented in Figs. 1 to 6, the shaft 1 of the distributor is connected through the clutch 2 and pair of gears 3 to the motor shaft 4. This motor shaft rotates counter-clockwise as indicated by the arrow and upon engagement of said clutch rotates the distributor shaft in known manner for one revolution.

Provided in the head 5 of the distributor are cams 7, which by means of pins 6 can be moved forwardly in the direction of the distributor shaft. These cams have forwardly projecting cam-shaped lugs 8 bearing against a stationary member 9 when the rotary distributor makes a revolution with transmission of a signal. In addition to these movable cams (7), there are provided stationary cams S and S*t* which control a single transmitting contact 10 according to the stationary stop or starting impulse. The pins 6 which serve to control the cams and of which there are ordinarily five, are guided in discs 11.

Between said discs are provided five locking discs 13 capable of being turned about the shaft 1 and held in a fixed position of rest by springs 12. The pins (6) are passed through slots 14 in these locking discs. Each of said slots is of pear-shaped form and has its reduced or smaller portion engaging a notch 15 (see Fig. 2) of one of the pins 6 when the transmitter is in the position of rest. Under the action of a spring 16, each of the cams tends to move into its operative position, but being locked by the notch 15 just described, is prevented from doing so. However, when the discs 13 are rocked against action of the springs 12, so that the larger portions of the pear-shaped slots (14) release their pins, the cams can then separately move forwardly under the action of springs 16 which

have been previously compressed for the purpose.

In order to set, for example, all five of the cams (7), one of the keys 17 and 25 at the side is depressed. Associated with these keys is a combination of bars I to V adapted to rock upon a shaft 18, as to which more will be said later, but these bars are not moved during the first portion of either key movement. On said bars are provided actuating members 19, adapted to tilt bell-crank levers 20 when one of the keys in its depression strikes against projections or shoulders on said combination of bars. Assuming that the foremost 17 of these keys is depressed and there is no underlying projection or shoulder on any of the combination bars I to V for the same to strike upon, of course none of the five bell-crank levers 20 connected therewith would be tilted. Accordingly, the engagement of the discs 13 with their projections 21 against the inclined ends 22 of said bell-crank levers would remain unbroken and undisturbed as shown. But if co-related striking shoulders are formed on any or all of the combination bars, the same will of course be actuated to tilt the connected levers when the key is depressed sufficiently.

During the second portion of the key depression movement, a sixth bar VI which is rocked by either or both keys is moved to actuate the hook member 24 with the parts shown so as to engage the clutch 2. The shaft 1 is then driven through one revolution by the motor (not shown). The discs 11 rigidly connected with said shaft of course rotate therewith. As the projections 21 of the discs (13) are still supported by the ends 22 of the bell-crank levers, all the springs 12 remain tensioned and said discs (13) will be swung through a short distance relatively to the shaft 1. All the cam pins 6 are thus released, so that under the action of the springs 16 said cams may snap forwardly with their cam lugs 8. On further rotation of the distributor in the direction of the arrow, springs 23 connected with the bell-crank levers (20), which up to this moment have held the same in the position of rest, are tensioned by the component pressure action on the ends (22) of said levers, so that during the further distributor rotation the discs 13 are moved without obstruction. If no cams 7 are to be adjusted, all the bell-crank levers 20 are actuated by the actuating members 19, which are secured to the combination bars I to V. Thus, no discs 13 are rocked, and all cams are held in their inoperative positions. The conditions of actuating the cams are represented in Figs. 4 and 5 when actuating a disc 13.

On rotation of the distributor, a key member 26 moves over the periphery of the cams and actuates the contact 10 according to the sequence set by the key. The conditions during the transmission of current impulses are illustrated in Fig. 6. In this figure the cams are shown in the developed position. Fig. 6*a* represents the rest position, Fig. 6*b* represents the conditions after setting the second and fourth cams, and Fig. 6*c* represents the conditions when transmitting current impulses. Above the cams on a level with the dotted cross lines, is located the actuating point 26 for the contacts, the same being designated by a black transverse line. In front of the cams is located the slip member 9. After setting the cams by releasing the springs 16, the entire set of cams moves in the direction of the arrow. A first actuation of the contact takes place by the coming of the part 26 into the free space above the stationary cam S*t*, so as to transmit the starting impulse for the distant receiver. When the second of these cams passes under the actuating point 26 for the set of springs, there is a change-over and said point does not again function until it falls into the gap of the third cam which has not been set. Another such change-over occurs when the fourth cam acts on the point, and at the conclusion of this, the stationary stop member S on the completion of the distributor rotation again produces the rest position of the set of springs. All these cams are shown to be of the same length. In order to secure the right reception of the transmitted impulses however, it is preferred to make them of different lengths and increasing uniformly from the starting cam S*t* over the movable cams to the stop S.

From the foregoing description, it will of course be understood that the lever 26 is raised and lowered by the several cams 7, S and S*t* during a rotation of the distributor (5). This lever thereby controls the springs of the contact 10 through which the current impulses are sent over a conductor line.

The aforementioned strip member 9 is arranged to lag relatively to the actuating lever or point 26 for the contact by the width of a cam. Therefore, while a contact change-over takes place, the previous cams are pressed back by their lugs 8 (see Fig. 3). Accordingly, during the return movement of the distributor the rest position is prepared for all its parts. In order to effect the return position, the disc 13 which up to the moment was located in the operative position against the action of its spring 12 can snap back, as then its pear-shaped slot 14 can swing into the reduced portion 15 of the pin 6 which has been moved back into the plane thereof. The springs 16 then remain tensioned until they are next released.

If a key (for example the key 17) is pressed to actuate the cams and rotation of the distributor has once started, it is no longer possible to disturb the transmission of impulses which has been arranged by actuating the other key (25). As the engaging projections 21 of the intermediate disc members (13) for actuating the cams have been moved out of contact with the inclined ends 22 of the bell-crank levers (20) during rotation of the distributor, actuation of these bell-crank levers for the purpose of actuating the cams is nullified or inoperative during this period. It is unnecessary to lock the combination bars (I to V) or the key, as is necessary in the usual telegraph transmitting apparatus. It will be understood that it is preferable to select the speed of the transmitting distributor for one revolution higher than the average speed of the keys.

As the cams with their lugs 8 in their position of rest are under the action of the stored force of the springs 16, it is not necessary in the key pressure to use a force to move the cams. These are merely released and during the rotation are positively returned by means of the strip member 9, while again tensioning the springs 16.

In order to ensure the stopping of the transmitting distributor without any rolling after completion of its revolution, there is provided a locking or catch lever 27 which by means of a projection 28 on its end falls into a recess 29 on

the clutch 2 when the transmitting member has made a complete revolution to the stoppage point. Thus in spite of the somewhat lengthy construction of the distributor, any oscillations of masses which might occur are absorbed and a sure stop without any rolling at the stop position is obtained.

The second example of construction illustrated in Figs. 8 to 11 embodies a transmitter of a type printing telegraph form according to the "start-stop" principle of which the forty-two keys 51 act on seven bars. The five combination bars 57I to 57V and the bar 58 are movable laterally, while the bar 59 has a rocking movement.

These combination bars (57) are each provided with forty-two teeth or recesses. The key levers 54 are provided with recesses 55 and projections 56 which they engage when the key is depressed in the toothed spaces of said combination bars and thus lock separate or all of the combination bars against lateral movement according to the series of current impulses to be transmitted.

The keys 51 (Figs. 8*a* and 8*b*) made rotatable or rockable upon the point 50 are in the rest position pressed by a spring 52 against an upper stop 53. The recesses 55 and the projections 56 of their levers (54) correspond in dimensions to a whole multiple of the distance between two combination bars. The combination bars (57) and the release bar (58) lie flat or side-by-side on their edges beneath the type lever 54. The bar 59 is adapted to rock upon the shaft 60 and is held in a rest position by a spring 61. When a key is depressed, as for instance the key which is to form or emit the current indications for the letter "T", the projections 56 of its lever (54), project into the tooth spaces 62 of the cooperating combination bars, which in this instance would be the first (57I), third (57III) and fifth (57V) combination bars, while the intermediate combination bars and the release bar 58 can be moved freely laterally. This movement is released by the rocking bar 59 as hereinafter described.

The combination bars (57) and the release bar 58 are each under the pressure of a tensioned spring 63 (see Figs. 7 and 11). The pressure of such spring acts through the bars on a rocking pawl 64. This rocking pawl is actuated by the finger 65 of the rocking bar 59 when depressing a key and releases the combination bars which have not been locked by the projections 56 when the key was depressed.

The released bars 57 and 58 guided on a slide-bearing shaft 66 snap into the operative position up to a stop 67 (see Figs. 9*a* and 9*b*, 10*a* and 10*b*).

The head of the bars 57 and 58 as will be seen from Figs. 9*a*, 9*b*, 10*a* and 10*b* is constructed in a particular manner. In these views the selecting bars (57) are shown provided with an abutment shoulder 68 for limiting the movement, a similar abutment 69 against which the return force acts, another abutment 70 serving for the actuation of a rocking lever 71 and a projection 72 for receiving a spring 73.

The said rocking lever 71 associated with each bar (57) is double armed, with pivoting on a shaft 74 and is held against the stop 70 by action of said spring 73. Its upper arm or end 75 projects into the path of projection 21 of one of the locking discs 13. The pawl 64 pivots on the shaft 77 and is pressed upwardly by a spring 78. A notch or abutment 79 of each of the bars 57 is placed somewhat lower than a similar abutment 80 on the release bar 58, so that the rocking of the pawl 64 by means of the finger 65 of the rocking bar (59) as before stated will first release said bars 57 and then the bar 58 (see figs. 9*c* and 10*c*). The rocking bar 59 is moved during the last portion of the multi-stage stroke of the key. After rocking the pawl 64, the finger 65 snaps into a recess of this pawl as indicated in Fig. 10*c*. Said finger is pressed against a stop 81 by a spring 82. When releasing the key, the finger again slips over the top of the pawl (64), which is thus prepared for a fresh operation. In the depressed position of the key, the pawl 64 is freely movable and can at any time snap behind the abutments 79 and 80 under the action of its return spring 78.

The release bar (58) acts with its front end as shown against a double-armed lever 83. In the rest position of the transmitter (Fig. 9*b*), the widened upper end 84 of said lever lies in front of the projections 85 of a pair of pawls 86. This pair of pawls upon release effects the coupling of a drum 87 with a shaft 88 by the rocking of said lever (83), in that the teeth 89 of said pawls engage with a toothed flange 90 on the shaft. A rocking of the lever 83 is produced on the release of the bar 58 by the rocking of pawl 64 when pressing each key.

The device which produces the necessary auxiliary source of power for the current impulse transmitter is not illustrated. It acts however through a toothed wheel 3 (Fig. 11) on the shaft 88 and rotates the current impulse transmitting device when engaged through the aforesaid drum 87. As will be understood from the first example of construction described, the current impulse transmitting device consists of a cam flange 93 which acts on the current impulse contact 10 and has its cams 7—8 (of Fig. 1) set selectively by locking discs 13 through pins 6 under the action of springs 16. The return of the cams 7—8 of said cam flange (93) is effected by the strip member 9 (Fig. 1) during the transmission of the current impulse series. The locking discs 13 are held by the springs 12 (Fig. 9*a*) in a definite rest position and by their recesses 14 lock at any time an actuating pin 6 for the cams 7—8 of the cam-flange 93. The separating locking discs 13 are rocked by the projections 21 and thus release a predetermined pin 6 which can snap forwardly a cam 7—8 under the action of the spring 16. In the case exemplified by Fig. 9*a*, the middle pin 6 is released by rocking the locking disc 13 through engagement of its projection 21 with the associated lever end 75 of the bar 57 which has not been set.

The cams 7—8 (Fig. 1) which have been set by the combination bars 57 that have not been moved during the first portion of the rotary movement of the transmitter, indicated at 100, remain for a portion of the rotation in this position until they are again brought into their rest position by the strip member 9. An external actuation by the selecting bars 57 or the rocking levers 71 is no longer possible after passage of the projections 21 beyond the projections 75 of said levers (71). The sequence of current impulses stored in the cam flange 93 is then transmitted once by the contact 10.

Also, during the first portion of the revolution of the transmitter 100, a tooth 96 carried by the transmittter 100 strikes against a pin 98 of a double-armed lever 101 (Figs. 9*a* and 10*a*),

which is pivotally mounted on pin 99. This lever 101 is held by springs 102 in a predetermined rest position from which it is moved only when said tooth 96 comes within reach of the pin 98. Then the lower arm of said lever is rocked to the left as indicated by the arrow and by means of a lower push-bar 103 returns all the bars 57 and 58 which are in the operative position. An excess movement then takes place, so that the pawl 64 under the action of spring 78 can engage in the abutment notches 79 and 80. This return of the bars takes place before the transmission of the selected current impulse series during the start section of the transmission.

During the return movement of the bar 58, the lever 83 is brought into its rest position (Fig. 9b) with its head in the path of the projections 85 of the clutch pawls 86. Therefore, if the drum 87 has made a revolution with the transmitting device 100 and the head 84 again strikes against said projections (85), the pair of pawls 86 become disengaged from the teeth of the toothed flange 90 and the transmitter 100 will then be stopped. The complete position of rest is determined by the aforementioned engaging member 27.

The method of operation of the arrangement is as follows:

If the letter "T" is transmitted, then during the first portion of the key (51) movement, the first, third and last of the combination or selector bars 57 are locked by corresponding stops 56. During a portion of the key movement the bar 59 is rocked and by the disengagement of the pawl 64 first releases the second and fourth of said combination bars (57) and then the release bar 58 under the action of the springs 63. These second and fourth combination bars move forwardly and tilt their rocking levers 71 out of the path of the projections 21. The bar 59 rocks its lever 83 so that the clutch of the transmitter 100 will be engaged with the driving wheel 3 by the release of the pair of pawls 86. By means of the motor (not shown) the current impulse transmitting device 100 is then rotated.

During the first portion of the movement the projections 21 of the first, third and fifth locking discs 13 strike against the heads (75) of the rocking levers 71 of the first, third and fifth combination bars (57) which are locked by the pressure of the key T. These locking discs (13) are turned and release the first, third and fifth pins 6, whereby the first, third and fifth cams 7—8 snap forwardly. During the further rotation, but still during the starting period, the tooth 96 actuates the rocking (57) and releases combination (58) bars to return them to the operative position. These bars during the further course of the transmission of current impulses then remain in the rest position as the pawl 64 engages independently of the actuating finger 65. A transmission of current impulses is effected through the contact 10 directly followed by a return of the cams by the strip member 9 (Fig. 1). After a complete revolution, the stops 85 strike against the head (84) of the lever 83 and disengages the transmitting device 100 from the driving wheel 3.

If the same or another key 51 after release is again depressed while the transmission of the first series of current impulses is under way, so that a fresh setting of combination (selecting) bars 57 is made with release of the other and the release bar 58, then after a revolution the transmitter 100 continues to turn for another revolution, as the lever 83 after initial return (Fig. 9b) has again been rocked (Fig. 10b) and so is prevented from stopping the transmitter. By a fresh storing in the cam flange 92, this series of current impulses corresponding with the key which has now been depressed is subsequently transmitted and the freshly set combination bars are again returned. In this manner a maximum writing speed is obtained.

The pawl 64 or the finger 65 can be adjusted in such manner that a snapping of the finger 65 after release of the bars 57 and 59 under the opening of the pawl 64 is not possible.

This will occur, if, for example, a double line is to be drawn by a continuous pressure on a key, say a figure key. In these cases the maximum writing speed obtainable is obtained by the simplest actuation, while the clutch is not in any way strained mechanically.

An essential simplification of the method of operation of the current impulse transmitter of the second example of construction is obtained in that the movement of the combination bars 57, when pressing a key, is caused to take place only under the action of an auxiliary force. In this manner it is necessary to use only a slight force in pressing the keys. The keys are easily struck so that during a writing no tiring phenomena occur.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A key board telegraph apparatus or current impulse transmitter adapted to be actuated by an auxiliary force comprising operating keys, combination bars actuated by said keys, movable cams, means for setting said cams in accordance with the setting of said bars, means actuated by the cams in accordance with their setting and adapted to actuate a contact for impulse transmission; said means for setting the cams in accordance with the setting of the combination bars including means actuated by said bars and intermediate members acted upon by the last-named means and actuating said cams, the said intermediate members being adapted to store up the combination of cam setting determined by pressing one of the keys independently of the others and being so constructed that during the actuation of said means actuated by the cams in accordance with their setting they are withdrawn from the influence exerted on the keys and the influence of the keys.

2. A key board telegraph apparatus actuated by an auxiliary force, consisting of operating keys, combination bars actuated by said keys, movable cams, means for moving the cams, means actuated by said cams in accordance with their setting, means for locking the cams against the action of said means for moving the same and for releasing separate cams according to the setting of the combination bars; said means including means controlled by the combination bars and intermediate members for locking and unlocking the cams, the said intermediate members being adapted to store up the combination of cam setting determined by pressing one of the keys independently of the others and being so constructed that during the actuation of said means actuated by the cams they are withdrawn from the influence on the keys and from being influenced by the keys.

3. A key board telegraph apparatus actuated by an auxiliary force consisting of operating

keys, combination bars influenced by said keys, movable cams, springs for moving said cams, means actuated by the cams according to their adjustment, means for locking the cams against the action of their moving springs and for releasing separate cams according to the adjustment of the combination bars; said means including members actuated by the combination bars and intermediate members adapted to lock and unlock the cams, these intermediate members being adapted to store the combination of cam adjustment determined by pressing one of the keys independently of the others and being so constructed that during the actuation of said means actuated by the cams they are withdrawn from the influence on and the influence of the keys, and means for returning the cams against the action of their moving springs.

4. A key board telegraph apparatus according to claim 3 wherein the means for returning the cams against the action of the springs are actuated by the auxiliary force which actuates the apparatus.

5. A key board telegraph apparatus according to claim 3 wherein the means for returning the cams against the action of the springs lag behind the means actuated by the cams and are actuated by the auxiliary force actuating the apparatus.

6. A key board telegraph apparatus comprising a rotary shaft, a rotatable body, cams carried by said body so as to move thereon in the direction of its axis and subjected to the action of springs, intermediate members also movably carried by said body so as to lock said cams and themselves carrying a clutch device for coupling the body to said rotary shaft driven by an auxiliary force, operating keys adapted to the selection of a desired current impulse series, combination bars actuated by said keys, means for actuating the clutch device upon pressing one of the keys, means for controlling the intermediate members of the rotatable body according to the setting of the combination bars; said members being so constructed that at the commencement of the rotary movement of said body they are actuated by the control means and release the selected cams for movement under the action of the aforesaid springs, means controlled by the released cams and influencing a transmitting contact, and means for returning the cams after exerting their action on the last-named means during the rotary movement of the rotary body.

7. A key board telegraph apparatus comprising in combination, a rotary body, cams carried by said body so as to be movable in the direction of its axis and subjectable to the action of springs, intermediate members also movably carried by said body and each of the same adapted to locking one of the movable cams; said members embodying discs rotatably mounted on the axis of the body and held under action of a spring in a position for locking the cams, a clutch device additionally carried by said body for connecting the same with a driving element, a rotary shaft driven by an auxiliary force with which said device connects the body, operating keys adapted to setting for the desired current impulse series, combination bars actuated by said keys to the desired setting, means for transmitting the setting of the combination bars to the intermediate members, means for actuating the clutch device upon pressing a key, stops on the intermediate members which at the beginning of the rotary movement of the rotary body are influenced by said means for transmitting the setting of the combination bars and thereby store the selected combination of cam adjustment for the current impulse in the intermediate members; said members when thus influenced against the action of their springs being turned to release the corresponding cams for movement under the action of the aforesaid springs to which they are subjectable, means controlled by the released cam and adapted to actuate a transmitting contact, and means for returning the cams after exerting their influence on the aforesaid means during rotary movement of the rotary body, said last-named means being stationary and relatively displaced to the means actuated by the cams for actuating the transmitting contact.

8. A key board telegraph instrument according to claim 7, wherein the means for transmitting the setting of the combination cams is in the form of rocking levers, the free ends of which are adapted at the commencement of the rotary movement of the rotary body to act on the stops of the intermediate locking members so as to return the same.

9. A key board telegraph instrument according to claim 7, wherein one of the keys upon being depressed first sets the combination bars and subsequently actuates the means for actuating the clutch.

10. A key board telegraph instrument according to claim 7, wherein the rotary body in addition to the movable cams thereon carries two further cams, one for the transmission of the starting impulse and the other for the transmission of the stop impulse, all the cams being of the same length.

11. A key board telegraph instrument according to claim 7, wherein the rotary body in addition to the movable cams thereon is provided with two further cams, one for the transmission of the starting impulse and the other for the transmission of the stop impulse, the length of all the cams being different and increasing uniformly from the starting cam over the movable cams to the stop cam.

12. A key board telegraph instrument according to claim 7, wherein the combination bars in their normal rest position are maintained under the action of springs and means are included to lock said bars against the action of these springs, along with means for releasing such locking by actuation of the keys, and means for returning the combination bars to their rest position, the several said means being actuated by the auxiliary force which actuates the rotary body.

13. A key board telegraph instrument according to claim 7, wherein the combination bars in their rest position are maintained under the action of means storing a force operable thereon and means are included for locking said bars against the action of said means, along with means for releasing such locking by actuation of the keys, and means for returning the bars to their rest position, the last named means being actuated before terminating the revolution of the rotary body by the auxiliary force driving said body.

14. A key board telegraph instrument according to claim 7, wherein the rotary body in addition to the movable cams is also provided with two further cams, one for the transmission of the starting impulse and the other for the transmission of the stop impulse and springs associ-

ated with the combination bars act upon the same in their rest position, there being included means for locking the combination bars against the action of said springs, means for releasing such locking by actuation of the keys, and means for returning the bars to their rest position and the said means being actuated during the transmission of the starting period by the auxiliary force driving the rotary body.

15. A key board telegraph instrument according to claim 7, wherein the combination bars in their position of rest are under the action of springs and means are included for locking said bars against the action of said springs; said means embodying a spring actuated pawl engaging with recesses in all the combination bars and a further bar carrying a finger adapted to move the spring actuated pawl out of locking position, the last-named bar being actuated by the keys after their engagement with the combination bars.

16. A key board telegraph instrument according to claim 7, wherein the combination bars in their position of rest are under the action of springs and are provided with projections and recesses adapted to co-operate with corresponding projections or recesses in levers of the keys; there being included also means for locking the bars against the action of said springs; said means comprising a spring actuated pawl engaging with a recess of each of the bars, a recess in said pawl, a further bar carrying a finger acting on the pawl so as after raising the same to pass through the recess thereof while releasing it; and said last-named bar being actuated by the keys after the engagement of the projections or recesses of the depressed key lever in the corresponding projections and recesses of the combination bars.

17. A key board telegraph apparatus according to claim 1, wherein the combination bars in their position of rest are under the action of springs and are provided with projections and recesses adapted to cooperate with corresponding projections or recesses of the key levers, there being included also means for locking the bars against the action of said springs; said means embodying a spring actuating pawl engaging with the recess of each of the bars, a recess in said pawl, a further bar carrying a finger acting on the pawl and adjustable so as to permit and prevent turning through the recess of the pawl while releasing it; said last-named bar being actuated by the keys after the engagement of the projections or recesses of the depressed key lever in the corresponding projections and recesses of the combination bars.

18. A key board telegraph instrument according to claim 7, wherein the combination bars in their position of rest are under the action of springs and there is included in combination, a locking pawl for locking the bars against the action of said springs and engaging with recesses of all said bars, means for releasing the pawl actuated by the keys, means for releasing the pawl independently of the pressing of a key, a rocking lever and a projection on the rotary body actuating said lever shortly after the commencement of the rotation of the rotary body; said lever carrying a bar for pressing back the set combination bars against the action of the aforesaid springs.

19. A key board telegraph apparatus comprising a rotary body carrying movable cams, a clutch device for connecting said body to a rotary shaft, keys for setting the movable cams for actuating the clutch device, combination bars actuated by said keys, and means for setting the movable cams according to the setting of said bars; said clutch device embodying a toothed wheel secured on a constantly rotating shaft and movable pawls mounted on the rotary body, springs acting on said pawls to effect a forcible engagement of the pawls with said toothed wheel, and movable levers actuated by the keys for locking the said pawls in their rest position against the action of the springs.

20. A key board telegraph apparatus according to claim 19, wherein is included an adjustable bar in its position of rest standing under the action of a spring, a pawl locking said bar, means actuated by the keys for disengaging said pawl, a recess in the bar in which lies the lower end of a movable lever acting on the pawls of the clutch device, and means actuated by the rotary body shortly after the commencement of its rotary movement for returning the adjustable bar to its rest position against the action of said spring.

21. A keyboard telegraph instrument according to claim 7, wherein the means controlled by the cams actuates a contact for transmitting current impulses.

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