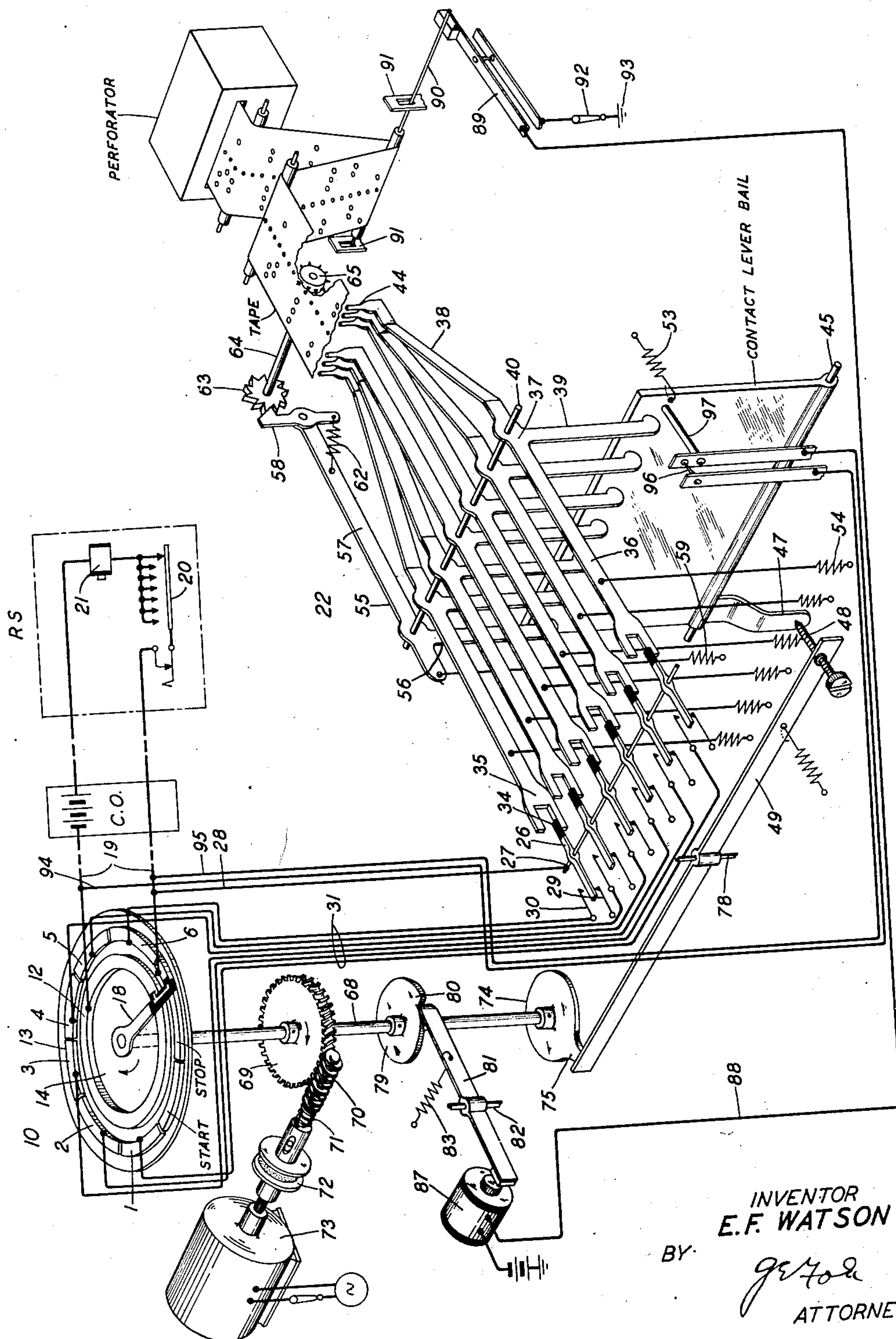


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TELETYPEWRITER SYSTEM

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This invention relates to teletypewriter systems and, more particularly, to high speed transmitter distributors for use in such systems.

Heretofore, in teletypewriter systems employing high speed transmitter distributors, trouble has been caused by the distributor brushes bouncing up out of contact with the segments when the brush arm is brought to a sudden stop. During the time that the brush is so raised, the communicative line circuit is opened to transmit a spacing signal to be registered at the receiving station. Needless to say, this inadvertent spacing signal causes considerable confusion and may result in communicative errors and false operation of various devices at the receiving station.

Consequently, it is an object of this invention to maintain the line circuit closed during the occasions when the distributor brush is likely to bounce.

In accordance with this invention, a normally open contact is operatively associated with a contact lever bail operated by the tape feed operating cam. Whenever the brush is on the central portion of the stop segment of the distributor face plate, the cam operates the lever bail which, in turn, closes the contact. This closes a shunt across the communication line thereby maintaining the line closed in case the brush should be stopped so suddenly as to cause it to bounce.

These and other features of the invention will be described in detail in connection with the drawing which shows schematically the transmitting apparatus of a local teletypewriter station having a remote teletypewriter station connected therewith through a central office.

Referring to the drawing, a distributor 10 comprises an inner solid commutator ring 12 and an outer commutator ring 13 both of which are suitably attached to the upper surface of an insulating disc 14. The outer commutator ring is divided into eight insulated segments which include the six segments corresponding to the six units of a code, a "stop" segment, and a "start" segment. A distributor brush 18 wiping on the stop segment closes a line circuit 19 connecting therewith a teletypewriter station RS preferably through a central office CO. The RS station is provided with the usual sending contacts 20 and receiving printer magnet 21. It will be understood that while a central office CO may be used for connecting the local distributor and the remote station RS, the invention is not necessarily limited thereto, and may be readily applied to a private wire, or direct wire system, wherein a central office is not employed.

A tape transmitter assembly 22 preferably arranged for "make-break operation is provided with six contact tongues 26 pivotally mounted on a shaft 27 which is connected by a lead 28 to one side of the line 19. Each of the six tongues is adapted to be rotated so that one end thereof engages either a spacing contact 29 or a marking contact 30, the latter being connected by leads 31 with the segments of the outer ring 13 corresponding to the six units of a code. It will be observed from the drawing that when a tongue 26 engages its marking contact 30, the line is connected with the corresponding segment of commutator ring 13. The spacing contacts 29 are always in the opened condition. The opposite end of each tongue 26 is provided with a tip 34 of suitable electrical insulating material which is adapted to engage a bifurcated end portion 35 of a horizontal prong 36 of a three-prong contact lever 37 that is formed with a second prong 38, substantially a horizontal extension of the prong 36, and a third prong 39 extending transversely in a downward direction from approximately the junction point between the prongs 36 and 38. This junction point provides a pivotal point for rotating the contact lever 37 on a shaft 40. The free end of each of the prongs 38 is formed into the shape of a pin 44 for projecting vertically upward into the perforations of the tape. The distances between the tape pins 44 are arranged to be identical with the distances between perforations produced in the tape by the perforator. Mounted directly to the right of the lower portions of the prongs 39 is a contact lever bail pivotally mounted on a shaft 45 and provided on the lower left end thereof with a projection 47 normally engaging an adjustable pin 48 extending through the right-hand end of an operating lever 49 mounted on a vertical pivot 18. The contact lever bail is normally urged in a clockwise direction by a spring 53. When the contact lever bail is actuated by the operating lever to the left in a manner to be described hereinafter, the prongs 39 are moved in a clockwise direction thereby rotating levers 37 about the shaft 40 to withdraw the pins 44 beneath the surface of the tape, and, at the same time, to cause the prongs 36 to be moved upwardly to actuate the tongues into engagement with their spacing contacts 29. It will be seen from the drawing that the prongs 36 are normally biased in a downward direction by springs 54 against actuation by the contact lever bail.

Also pivoted on the shaft 40 to the extreme left of the contact levers 37 is a feed lever 55 formed with a transverse prong 56 extending ver-

tically downward for engagement with the contact lever bail and a horizontal prong 57 provided on its free end with a pivotal feed pawl 58. The feed lever 55 is normally drawn in a counter-clockwise direction by a spring 59. The pawl is normally urged by a spring 62 into engagement with a ratchet wheel 63 fixedly carried on one end of a shaft 64 which is provided on its opposite end with a feed wheel 65 arranged with suitable teeth for projection into the spaced perforations provided longitudinally in the central portion of the tape to effect the advancement thereof. The position of the feed pawl with respect to the ratchet is determined so that a downward movement of the prong 57 under actuation of the contact lever bail does not permit the feed pawl to engage the ratchet to advance the tape until the six tape pins 44 have been drawn below the tape surface by a leftward movement of the contact lever bail as previously explained. In this manner it is made certain that the tape is not advanced before the withdrawal of the pins 44 therefrom to obviate a tearing of the tape.

In setting up combinations in the transmitter for transmission by the distributor, the contact lever bail is normally biased to the right by the spring 53 out of engagement with the prongs 39. This allows the springs 54 attached to the prongs 36 to cause a counter-clockwise rotation of the contact levers 37 to move the pins 44 upwardly into engagement with the under-surface of the tape. In this position certain ones of the pins 44 will be accommodated by appropriate code perforations in the tape and, accordingly, will be projected thereinto. Any additional movement of a particular contact lever 37 occasioned by the projection of its pin 44 into its tape perforation will cause the prong 36 of that lever to move downwardly a corresponding amount thereby rotating the contact tongue 26 from the spacing contact 29 into engagement with the marking contact 30. Obviously, the absence of perforations in the tape will block the pins 44 to prevent any additional movement of the levers 37 and, hence, the contact tongue 26 associated with a blocked lever 37 will be retained on the spacing contact 29. It will be readily understood, therefore, that when there is a perforation in the tape to accommodate the pin 44, the corresponding contact tongue will move into engagement with its marking contact 30 thereby connecting one side of the line to the segment of commutator 13 with which that contact is associated to transmit a marking impulse over the line. When a pin 44 is blocked, due to the absence of a tape perforation, the contact tongue corresponding thereto remains on its spacing contact 29, and the segment of the commutator 13 associated with the latter will cause a spacing or no-current impulse to be transmitted over the line.

The brush 13 comprising metallic portions for wiping over the commutator rings 12 and 13 is mounted on one end of a main drive shaft 68 having a gear wheel 69 fixed thereon in mesh with a worm 70 carried on a shaft 71 which is connected through a friction clutch 72 to a motor 73 employed to drive the main shaft 68. On the lowermost portion of the shaft 68 is fastened a tape feed operating cam 74 provided with a raised cam portion 75 which engages the left end of the operating lever 49 pivoted at 78 to actuate the contact lever bail. The raised cam portion is predeterminedly fixed on the main drive shaft with respect to the brush in a manner so that when the brush commences to wipe over the stop seg-

ment of the outer commutator ring 13 after each revolution, the lever 49, which heretofore was riding on the low portion of the cam 74, begins now to engage the raised cam portion 75 with the result that the contact lever bail is started in its movement to left on pivot 45. The continuation of the latter movement pushes the prongs 39 in a clockwise direction thereby causing the prongs 36 to disengage from the marking contacts 30 any tongues that may have been in engagement therewith and to move them into touch with the spacing contacts 29. As previously seen, the contact lever bail also actuates the feed lever 55 and, in addition, effects the withdrawal of the pins 44 from the tape perforations before the tape is advanced. With this kept in mind, it will be understood that as the raised cam portion 75 commences to engage the lever 49, the prong 57 of the lever 55 begins to move downward to cause the pawl mounted thereon to start the rotation of the ratchet. When the lever 49 reaches the highest point of the cam portion 75, the ratchet is moved an angular distance to an amount equivalent to the distance between contiguous teeth of the ratchet. Accordingly the tape is advanced to set up the code unit combination for the next character to be transmitted.

In the normal operation of the transmitter distributor, it occurs frequently that there is a difference between the rate at which the character units are transmitted and that at which the tape is fed from the perforator. Since the tape is fed directly from the perforator to the transmitter, it will be evident that, if for any reason the perforator operation is interrupted, the transmitter will use up all of the slack in the tape and thereafter proceed to damage the feed holes used with the feed wheel 65 for advancing the tape, unless a provision is made to stop the transmitter distributor automatically. For the purpose, therefore, of taking care of the difference between the rates of operation of the transmitter distributor and the perforator, there is fixedly mounted on the main drive shaft intermediate the gear wheel 69 and the tape feed operating cam 74 a stop cam 79 formed with a peripheral shoulder 80. Associated with the stop cam is a stop arm 81 pivoted at 82 and normally having one end held in engagement with the periphery of the stop cam by a spring 83. The opposite end of the stop arm is operatively associated with a magnet 87 which is employed to rotate the stop arm about its pivot to move the former out of engagement with the stop cam periphery. Battery is connected through the winding of the magnet by a lead 88 to an electrical contact 89, which is opened and closed under control of an automatic stop lever 90 projecting between the transmitter and perforator so that the tape passes thereunder and supported in vertical slots provided in upright members 91, 91. The contact 89 is also connected through a manually operated switch 92 to ground 93.

After the motor 73 has been started by closing the switch in its power supply circuit, the manual switch 92 is closed to complete an energization circuit for the magnet 87. This circuit may be traced from ground 93, switch 92, contact 89 when closed, lead 88, winding of the magnet 87 to battery and ground. The magnet operates to disengage the stop arm from the stop cam to permit the rotation of the main drive shaft. So long as the perforator continues to operate, the tape being fed therefrom will have sufficient slack to allow the stop lever 90 to rest on the upper member

of contact 89, thereby retaining the latter in the closed condition. In the event that the perforator operation is interrupted the tape will be pulled taut to raise the stop lever 90 out of engagement with contact 89 thereby enabling the upper spring member of the contact to disengage from the lower member to interrupt the circuit through the magnet. The stop arm 81 actuated by the spring 83 then moves into contact with the stop cam 80 periphery and eventually engages the shoulder 80 to stop the distributor brush by holding the main drive shaft from rotation. In this event, it will be evident that the transmitter is also stopped since it is also driven from the main shaft. It will be understood that the distributor brush will only be stopped on the "stop" segment of the commutator 13 due to the fact that the shoulder 80 of the stop cam 78 is predeterminedly positioned with respect to the distributor brush to effect this result.

Inasmuch as the distributor brush rotates at a high speed in transmitting the impulses set up by the transmitter, it is required to come to a stop rather abruptly in the event that the stop lever 90 interrupts the energization circuit of the stop magnet. As a result of the sudden stop, the distributor brush is frequently caused to be disengaged from the stop segment of commutator 13 thereby opening the line circuit and tending to transmit a false space impulse to the receiver of station RS.

In the preferred form, this invention obviates the transmission of the false impulse by closing the line circuit through leads 94, 95 and contact 96 on all occasions when the distributor brush wipes over the central part of the stop segment of commutator ring 13 upon the completion of each character transmission. This is accomplished by mounting a pin 97 in the upper right hand portion of the contact lever bail so that the pin 97 will always effect the closing of the normally open contact 96 when the lever 49 engages the raised portion 75 on the stop cam 74, the latter happening, as previously described, on each occasion that the brush wipes over the central part of the stop segment of the commutator 13 in the completion of the transmission of one character code. Immediately prior to the instant when the stop arm 81 engages the shoulder 80 of the stop cam 79, the contact 96 is closed. Contact 96 opens before the brush 18 commences to wipe the start segment for the transmission of the next combination of code impulses. It is seen, therefore, that when the distributor brush is stopped on the central part of the "stop" segment, the line circuit may be closed simultaneously through either of two paths, first through the "stop" segment, distributor brush, and commutator ring 12; and, secondly, through the path of leads 94, 95, and contact 96.

Accordingly, it is evident that the closing of the line circuit through the two paths simultaneously serves to preclude the transmission of a false spacing signal occasioned by the distributor brush bouncing, or disengaging, from the stop segment, since the line circuit will always be closed through the second path at the time when the brush disengagement is most likely to occur.

What is claimed is:

1. A teletypewriter system having in combination a distributor having a segmented face-plate and a rotatable brush adapted to travel over the surface of the face-plate, said distributor being connected to a closed telegraph line, driving means for causing the brush to travel over the surface

of the face-plate, control means for stopping the movement of the brush, and instrumentalities for preventing the closed line from being unintentionally opened by reason of the brush bouncing into the air when it is stopped, said instrumentalities including a contact adapted to close a shunt across the closed line whenever the brush is in condition for being stopped.

2. A teletypewriter system having in combination a high-speed transmitter-distributor having a segmented face-plate and a rotatable brush adapted to travel over the surface of the face-plate, said transmitter-distributor being connected to a normally closed telegraph line, said segmented face-plate having a stop segment, driving means for causing the brush to travel over the surface of the face-plate at a high speed, control means for suddenly stopping the movement of the brush, and instrumentalities for preventing the normally closed line from being unintentionally opened due to the brush bouncing into the air when it is suddenly stopped, said instrumentalities including a normally open contact controlled by a cam and adapted to be closed whenever the brush is on the stop segment of the distributor face-plate.

3. A teletypewriter system having in combination a transmitter-distributor provided with a segmented face-plate and a brush adapted to wipe over the face-plate, said face-plate comprising a plurality of segments including a stop segment, a telegraph line circuit connected to the transmitter-distributor and normally closed through the stop segment and the brush, driving means for causing the brush to wipe over the segments, control means associated with the transmitter-distributor for abruptly stopping the brush when the latter has reached the stop segment, and means controlled by the driving means for shunting the transmitter-distributor on the line circuit to prevent the line circuit from being inadvertently opened due to the brush disengaging the stop segment when the brush is abruptly stopped thereon.

4. A teletypewriter system having in combination a transmitter-distributor provided with a segmented face-plate and a brush to wipe over the face-plate, one of the segments being designated a stop segment, the transmitter-distributor being connected to a telegraph line circuit normally closed through the stop segment and the brush, driving means for causing the brush to wipe over the segments, control means associated with the transmitter-distributor for abruptly stopping the brush when the latter has reached the stop segment, and means operatively connected with the driving means for shunting the transmitter-distributor on the line circuit when the brush has been stopped on the stop segment.

5. A teletypewriter system having in combination a transmitter-distributor provided with a segmented face-plate and a brush to wipe over the face-plate, one of the segments being designated a stop segment, the transmitter-distributor being connected to a telegraph line circuit normally closed through the stop segment and the brush, driving means for causing the brush to wipe over the segments, control means associated with the transmitter-distributor for abruptly stopping the brush when the latter has reached the stop segment, normally opened electrical contacts connected to the line circuit in parallel with the transmitter-distributor, means operatively connected to the contacts for effecting an engagement therebetween, and means associated with the driving means for actuating the contact means

to effect an engagement between the contacts when the brush has been stopped on the stop segment thereby short-circuiting the transmitter-distributor through the contacts.

- 5 6. A teletypewriter system having in combination a transmitter-distributor provided with a segmented face-plate and a brush to wipe over the face-plate, one of the segments being designated a stop segment, the transmitter-distributor
10 being connected to a telegraph line circuit normally closed through the stop segment and the brush, driving means for causing the brush to wipe over the segments, control means associated with the transmitter-distributor for abruptly
15 stopping the brush when the latter has reached the stop segment, and means operatively connected with the driving means for short-circuiting the transmitter-distributor on the line circuit
20 when the brush has been stopped on the stop segment, the means comprising a normally opened electrical contact adapted to be closed by a cam associated with the driving means to short-circuit the transmitter-distributor on the line circuit
25 whenever the brush is stopped on the stop segment.

7. In a teletypewriter system, a plurality of concentric commutators, one of the commutators comprising a plurality of segments including a stop segment, a brush for wiping over the com-
30 mutators, a telegraph line normally closed as the brush wipes the stop segment, a transmitter connected with the segmented commutator, means for actuating the brush and transmitter, and a device operated by the transmitter for
35 shunting the commutators as the brush wipes the stop segment.

8. In a teletypewriter system, a plurality of concentric commutators, one of the commutators comprising a plurality of segments including
40 a stop segment, a brush for wiping over the commutators, a telegraph line normally closed as the brush wipes the stop segment, a transmitter connected with the segmented commutator, means for actuating the brush and transmitter, means
45 for stopping the actuating means so that the brush stops on the stop segment, and an instrumentality operated by the transmitter for shunting the commutators when the brush is stopped.

9. In a teletypewriter system, a plurality of concentric commutators, one of the commutators comprising a plurality of segments including a stop segment, a brush for wiping over the com-
50 mutators, a telegraph line normally closed as the brush wipes the stop segment, a transmitter connected with the segmented commutator, means for actuating the brush and transmitter, and a device for providing a second path for closing the line as the brush wipes the stop segment, said
55 device including a normally opened contact connected in shunt with the commutators and arranged to be closed by the transmitter as the brush wipes the stop segment.

10. In a teletypewriter system, a plurality of concentric commutators, one of the commutators comprising a plurality of segments including a stop segment, a brush for wiping over the com-
65 mutators, a telegraph line normally closed when the brush rests on the stop segment, a tape, a perforator for the tape, a transmitter connected with the segmented commutator including a device for drawing the tape from the perforator, means for actuating the brush and transmitter, means controlled by the tape for stopping the actuating means so that the brush rests on the stop
70 segment, and a device for providing a second

path for the closing of the line when the brush rests on the stop segment, said device including a normally opened contact connected in shunt with the commutators and arranged to be closed by the transmitter when the brush rests on the stop
5 segment.

11. In a teletypewriter system, a plurality of concentric commutators, one of the commutators comprising a plurality of segments including a stop segment, a brush for wiping over the com-
10 mutators, a telegraph line normally closed when the brush rests on the stop segment, a tape, a perforator for the tape, a transmitter connected with the segmented commutator including a device for drawing the tape from the perforator, 15 means for actuating the brush and the transmitter, means for stopping the actuating means so that the brush rests on the stop segment, means associated with the tape for operating the stopping means, and an instrumentality operated
20 by the transmitter for shunting the commutator when the brush is stopped on the stop segment.

12. In combination, a motor, a distributor driven by the motor, the distributor comprising a segmented ring having a stop segment and a
25 brush traversing the ring, a circuit for periodically short-circuiting the distributor, contacts serving to close and open the circuit, and means responsive to each traverse of the stop segment by the brush for operating the contacts. 30

13. In combination, a distributor connected to a communication channel, said distributor having a segmented face-plate, a brush adapted to sweep over the segments of the face-plate serial-
35 itim, driving means for driving the brush, a contact for shunting the distributor out of the communication channel, and operating means for operating the contact. 35

14. In combination, a distributor connected to a telegraph line, said distributor having a seg-
40 mented face-plate, a brush adapted to sweep over the segments of the face-plate serialtim, driving means for driving the brush, a contact for shunting the distributor out of the telegraph line, and operating means for operating the contact, said
45 operating means being actuated by said driving means.

15. In combination, a distributor connected to a communication channel, said distributor having a segmented face-plate, a brush adapted to sweep
50 over the segments of the face-plate serialtim, driving means for driving the brush, a contact for closing a shunt path across the communication channel, and operating means for closing the contact whenever the brush is sweeping over a
55 preassigned segment of the distributor face-plate.

16. In combination, a distributor connected to a communication channel, said distributor having a segmented face-plate, a brush adapted to sweep over the segments of the face-plate serial-
60 atim, driving means for driving the brush, a contact for shunting the distributor out of the communication channel, and operating means for alternately and repeatedly opening and closing the contact.

17. In combination, a distributor connected to a telegraph line, said distributor having a seg-
65 mented face-plate, a brush adapted to sweep over the segments of the face-plate serialtim, driving means for driving the brush, a contact for closing a shunt path across the telegraph line, and cam actuated means for alternately and repeatedly opening and closing the contact.

18. In combination, a distributor connected to a communication channel, said distributor hav-

ing a segmented face-plate, a brush adapted to sweep over the segments of the face-plate seriatim, said brush being mounted upon a driven drive shaft, a contact for closing a shunt path across the communication channel, and a cam mounted upon said drive shaft for operating the contact.

19. In combination, a distributor connected to a communication channel, said distributor having a segmented face-plate, a brush adapted to sweep over the segments of the face-plate seriatim, said brush being mounted upon a driven drive shaft, a contact for shunting the distributor out of the communication channel, and actuating means for actuating the contact at predetermined intervals, said actuating means being operatively connected to said drive shaft.

20. In combination, a distributor connected to a telegraph line, said distributor having a segmented face-plate, a brush adapted to sweep over the segments of the face-plate seriatim, said brush being mounted upon a driven drive shaft, a contact for periodically closing a shunt path across the telegraph line, and operating means for periodically operating the contact, said operating means being controlled by said drive shaft.

21. In combination, a distributor connected to a telegraph line, said distributor having a segmented face-plate, a brush adapted to sweep

over the segments of the face-plate seriatim, said brush being mounted upon a driven drive shaft, stopping means for stopping the brush, a contact for shunting the distributor out of the telegraph line whenever the stopping means operates, and actuating means for operating the contact, said actuating means being controlled by a cam mounted upon said drive shaft.

22. A teletypewriter system having in combination a distributor including a segmented face-plate, a rotatable brush adapted to travel over the surface of the face-plate, said distributor being connected to a closed communication line, driving means for causing the brush to travel over the surface of the face-plate, control means for causing the movement of the brush to cease, and means responsive to each rotation of the brush for shunting the distributor out of the line.

23. In combination, a transmission circuit, an impulse transmitter connected thereto for sending electrical impulses over the transmission circuit, actuating means for actuating the impulse transmitter, starting means for starting the actuating means, stopping means for stopping the actuating means, and means responsive to the operation of the stopping means for preventing an impulse from being unintentionally sent over the transmission circuit.

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