

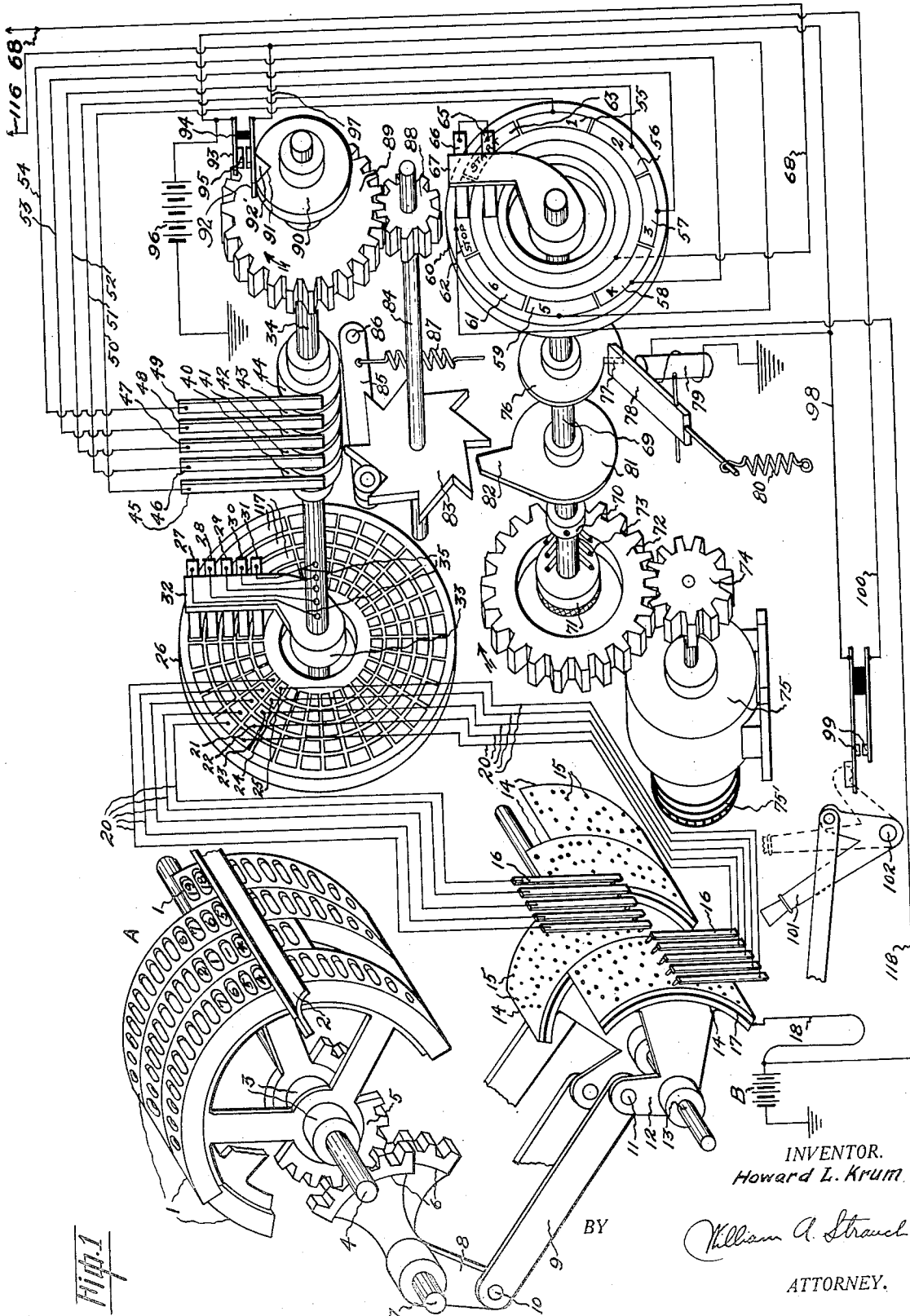
June 21, 1932.

H. L. KRUM

1,864,074

TELEGRAPH SIGNALING SYSTEM

Original Filed April 2, 1928 2 Sheets-Sheet 1



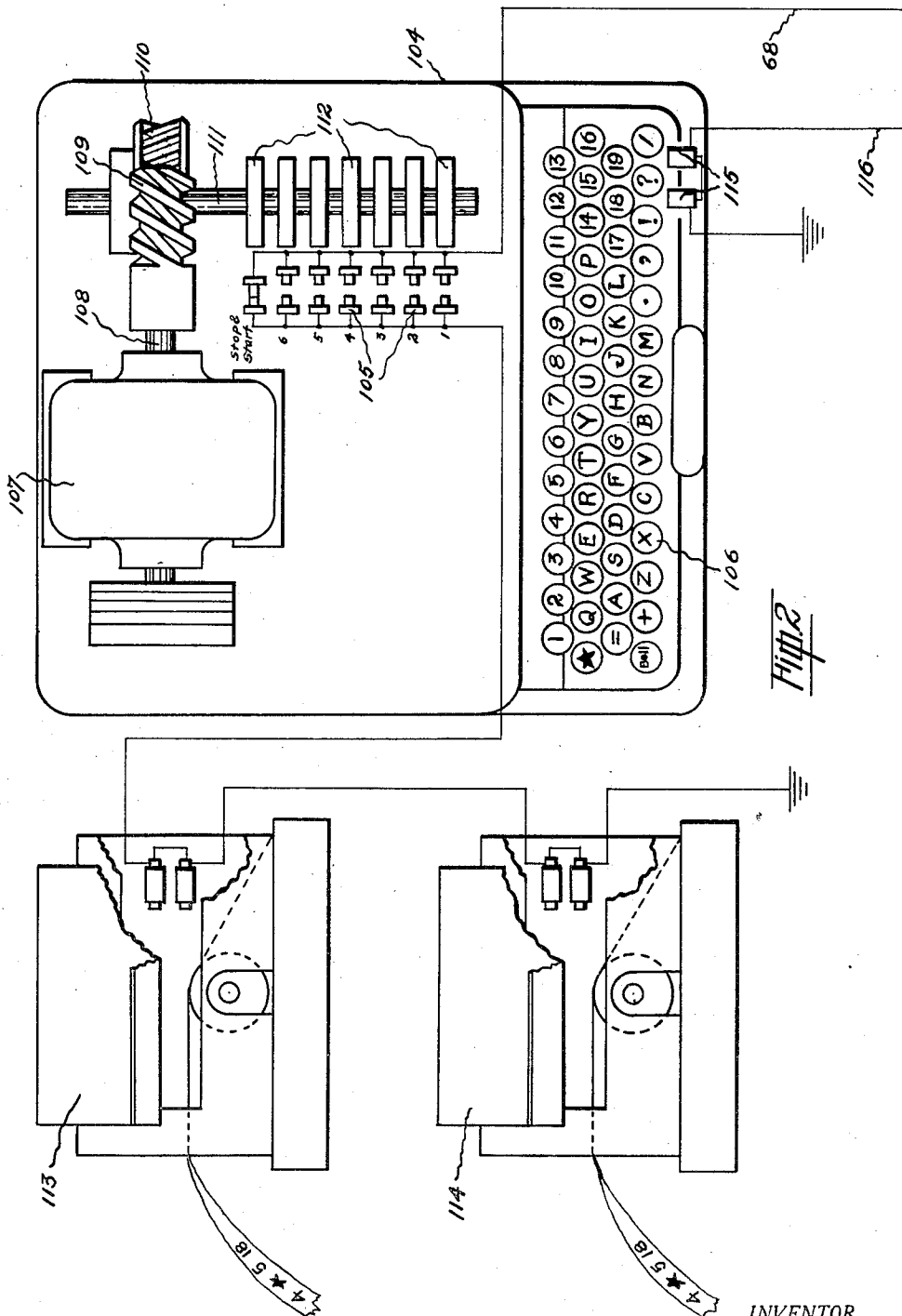
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TELEGRAPH SIGNALING SYSTEM

Original Filed April 2, 1928 2 Sheets-Sheet 2



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TELEGRAPH SIGNALING SYSTEM

Application filed April 2, 1928, Serial No. 266,734. Renewed January 6, 1931.

This invention relates to telegraph signaling systems and more particularly to code signaling systems in which the code combinations of signals to be transmitted are set up or stored in the order in which they are to be transmitted.

Heretofore, messages have been stored in comparatively complicated storage transmitters well known in the telegraph art or by perforated tape controlled transmitters, giving no easily accessible visible indication of the message set up for purposes of checking the matter to be transmitted at the time it is set up and before transmission. In many instances for example in the case of fire alarm signaling, it is highly desirable that means be provided to give a continuous visual check of the signals as they are set up prior to transmission.

Accordingly, the objects of my invention are to provide simple and inexpensive systems and means for setting up messages or signals to be transmitted by code combinations of impulses in a manner to leave the message visible to the operator at all times and to provide a code combination storage device that independently of the transmitting mechanism maintains the entire message visible until the device is reset for transmission of a new message.

In numerous code signaling systems such as fire alarm, telegraphs, the signals transmitted comprise largely numerals. It is desirable in such systems to provide for the transmission of telegraphic message material in addition to the number signals over the same line, without however, permitting interference with the number signaling to occur.

Other objects of my invention, accordingly, are to provide simple and inexpensive systems and means for transmitting and receiving a plurality of messages in independent codes over the same signaling circuit; and to provide a system of the character mentioned in which mutilation of signals of the different codes is prevented.

Other objects of my invention together with the foregoing, are defined by the scope of the appended claims and appear in the

specification disclosing a preferred embodiment of my invention.

As shown in the drawings Figs. 1 and 2 are diagrammatic representation of the apparatus and circuit arrangements employed in carrying out a preferred embodiment of my invention.

Referring to Figure 1, a transmitter "A" is provided embodying a plurality of dials or wheels of which only four are shown, although it is to be understood that any number of dials may be employed depending upon the number of signals it is desired to set up or store at one time may be employed, the number for the purpose of the present disclosure being at least twenty-five. Dials 1 may be of any well known type and as shown comprise wheels with finger receiving recesses arranged circumferentially thereon and in the bottoms of which characters are printed. A stop 2 suitably secured to the frame of the transmitter extending across the periphery of wheels 1 provides a guide for setting up signals to be transmitted as will more fully hereinafter appear.

Each of the wheels 1 is provided with a hub 3 journaled on the shaft 4, properly supported on the frame work (not shown) of the transmitting apparatus. A gear sector 5 is formed integrally with each hub 3 the teeth of which mesh with the teeth of gear sectors 6 which are in turn journaled on spindle 8 supported in the frame work (not shown).

Formed integrally with sectors 6 are arms 8 to the ends of which links 9 are connected by means of pins 10. The opposite ends of links 9 are pivotally connected by pins 11 to the upwardly extending arms of bell crank members 12. Bell crank members 12 are journaled on spindle 13 supported in the frame work of the transmitter, and are each provided with commutator sectors 14 in which transverse rows of contacts 15 are imbedded in insulating materials and arranged in accordance with the code to be transmitted and to correspond with the characters appearing in the recesses on wheel 1. Contacts 15 are connected through conducting plates 17 and conductors 18 to one pole of a ground battery B. The nature of the signals trans-

mitted is determined by the arrangement of the contacts 15. As shown, each sector 14 is provided with space for five rows of contacts 15 permitting transmission of five unit
 5 code combinations of marking and spacing conditions as will more fully hereinafter appear.

Suitably supported sets of five fingers or brushes 16, one set individual to each wheel
 10 with their ends arranged in a horizontal line urged into engagement with the sectors 14 are provided. As will now be evident by operating wheels 1, the corresponding code sectors 14 are moved to a relative position with respect to its brushes 16, depending upon the arcs through which the wheels are moved. A message may thus be set up for transmission which may be read by the operator reading transversely above stop member 2. Since
 15 each of the wheels 1 controls a full set of characters for which there is an individual code combination of impulses, the wheels may be independently positioned for the transmission of any particular character and may be maintained so positioned during the full transmission period. Each set of the brushes 16 is connected by conductors 20 to a separate set or group of conducting segments 21 to 25, which as shown are arranged in radial
 20 groups on distributor 26 so that each set of brushes 16 is individual to a group of radial segments 21 to 25 on distributor 26. Arranged to successively engage the groups of radial segments 21 to 25 is a set of brushes 27 to 31, each brush being arranged to wipe over a predetermined one of the segments in each radial group. Brushes 27 to 31 are properly insulated from each other and are mounted on brush arm 32 provided with hub
 25 33 rigidly secured for rotation with the shaft 34.

Each of the brushes 27 to 31 are connected by means of conductors 35 individual thereto and passing centrally through shaft 34,
 30 to individual conducting connector rings 40 to 44, properly insulated from each other and rigidly secured for rotation with the shaft 34. Engaging rings 40 to 44 are the brushes 45 to 49 which wipe over the individual connector rings as the shaft 34 rotates and are connected respectively by means of conductors 50 to 54 to segments 55 to 59 respectively of a single revolution start-stop distributor 60.

Distributor 60 comprises in addition to segments 55 to 59 connected to conductors 50 to 54 respectively, a sixth pulse segment 61, a stop segment 62, and start segment 63 for the transmission of a start impulse. A continuous ring 64 is provided on distributor 60
 60 which is successively connected to the segments 55 to 59 and 61 to 63 by a pair of electrically connected brushes 65 and 66 carried by a brush arm 67, and is in turn connected
 65 to line conductor 68 connecting the trans-

mitting station with each of the remote stations.

When a code sector 14 has been positioned by the movement of its individual dial as described above, electrical circuits are prepared
 70 over conductors 20 to segments 21 to 25 of distributor 26 individual thereto and the battery "B" is connected thereto in accordance with the arrangement of contacts 15 in engagement with brushes 16. As brushes 27 to
 75 31 engage with the particular radial group of segments 21 to 25 allotted to the set sector, the prepared circuits are extended to the conducting rings 40 to 44, brushes 45 to 49, conductors 50 to 54 to segments 55 to 59 on the
 80 main distributor 60. As the brush of the main distributor 60 rotates in a manner to be described in detail hereinafter, the prepared circuits from each of the brushes 16 are successively completed and the corresponding
 85 combinations are impressed upon signaling line 68.

Distributor arm 67 is secured to one end of and driven by a shaft 69 adjacent the opposite end of which a collar 70 is rigidly secured, and slidably keyed on the end of shaft 69 is a friction clutch disc member 71 urged in frictional engagement with a suitable driving face of gear 72 journaled on shaft 69 by means of spring 73 interposed between collar 70 and disc 71. Gear 72 meshes with
 90 and is driven by a pinion 74 which is in turn driven by motor 75. Motor 75 is provided with a speed indicating device 75' which may be of any well known form such for example
 95 synchronoscopic type to permit proper speed adjustment of the motor by an attendant.

Secured for rotation with the shaft 69 is a shouldered control cam member 76, the shoulder 77 of which engages the end of armature 78. Armature 78 of magnet 79 is held in the position shown by spring 80, one end of which is secured to the armature and the other end secured to the framework (not shown). Magnet 79 is normally de-energized and in this condition, clutch disc 71 slips as the gear 72 is rotated by motor 75, the shaft 69 being held from rotation due to the engagement of the armature 78 with the shoulder 77. When magnet 79 is energized
 105 in a manner to be described in detail hereinafter, armature 78 is pulled out of engagement with the shoulder 77 against the tension of spring 80, the shaft 69 is released and is rotatably driven by the motor 75 through
 110 the pinion 74, the gear 73 and clutch disc 71.

A disc 81 provided with a projection 82 is mounted upon and driven by the shaft 69, and is so positioned that on each revolution,
 125 projection 82 thereof engages a tooth of ratchet wheel 83 to rotate it through a step equal to the pitch of the ratchet teeth. Ratchet wheel 83 is secured to and drives shaft 84 in a counter clockwise direction and
 130

is held from clockwise rotation by means of the holding pawl 85 suitably mounted by means of pivot 86 on the framework (not shown) and held in engagement with the teeth of the ratchet wheel by a spring 87 one end of which is secured to the pawl 85 and the other end to the frame of the transmitter. Shaft 84 is suitably mounted on bearings (not shown) and supports and drives a pinion 88 meshing with and driving gear 89. Gear 89 is mounted on and drives the distributor shaft 34. By this arrangement, for each complete revolution of the shaft 69, ratchet wheel 83 is turned a distance of one tooth as it is engaged by the projection 82, and in turn rotates shaft 84 and pinion 85 through an equivalent arc. The gear 89 meshing with pinion 88 is thereby rotated through a predetermined arc and the parts are so arranged that the brushes 27 to 31 will move from engagement with one group of segments 21 to 25 to the succeeding group of segments. In this manner after each complete revolution of shaft 69 brushes 27 to 31 are stepped to the succeeding set of distributor segments 21 to 25.

Secured to the end of shaft 34 and driven thereby is a control disc 90 provided with a control notch 91. A spring contactor 92 is provided with a V-shaped cam member 92' and is arranged to ride on the periphery of disc 90 as the latter turns with shaft 34, and to enter the notch 91 at the normal position of the disc shown. A second spring contactor 93 insulated at 94 from spring 92 engages the contact of 92 at 95 when member 92' is raised from notch 91 to the circumferential edge of the disc 90 and to complete a circuit from grounded battery 96 over conductor 97 to magnet 79 locking the magnet energized during the rotation of disc 90 as will more fully hereinafter appear.

It will be recalled that rotation of shaft 69 is effected by disengagement of the armature 78 from shoulder 77 as a result of the energization of magnet 79. Magnet 79 is grounded and is connected over conductor 98 start contacts 99 and conductor 100 to grounded battery 96. Start contacts 99 are controlled by start lever 101 pivoted at 102 which when rotated from the position shown in full to the dotted position, closes contacts 99 to complete an energizing circuit for the magnet 79 from battery 96 over conductors 100 and 98. In operation start lever is operated to close contacts 99 just long enough to start the apparatus into operation.

The transmitting apparatus so far described above is particularly arranged to transmit fire alarm signals, but may obviously be used to transmit other message material. However, where it is desired to transmit any substantial quantity of message material standard telegraph type-writer or teletype mechanisms such for example as

shown in United States Patent numbered 1,635,486 may be used the transmitter being shown diagrammatically at 104 (Fig. 2) and comprising a series of contacts 105 for transmitting code combinations of impulses in accordance with the operations of key levers 106. Motor 107 as it rotates drives shaft 108 which in turn through worm 109 meshing with gear 110 on shaft 111 drives the latter. A series of cams 112 on shaft 111 are arranged to successively close the contacts 105 for transmitting six unit code combinations of impulses in the manner set forth in the above mentioned patent to operate receiving printers 113 and 114 at remote stations. Printers 113 and 114 are indicated as printers of the general type disclosed in detail in Patent 1,635,486 but are arranged to respond to signals composed of six units rather than the five unit mechanisms disclosed in said patent in a manner readily understood by those skilled in the art.

As transmitters "A" and 104 are independently operable, a keyboard locking magnet indicated diagrammatically at 115 connected over conductor 116 to conductor 97 is energized from battery 96 when contacts 95 close and as soon as the transmitter "A" is set into operation. Magnet 115 controls any well known keyboard locking mechanism such for example as is shown in United States Patent No. 1,769,834 to lock keyboards 104 against operation. In this manner the transmitter 104 is locked in a non-operative condition while transmitter "A" is in operation.

When the apparatus is in its normal non-operating position, the motor 75 is running, but since magnet 79 is de-energized, shaft 69 is held from rotation by the armature 78 which is in engagement with the shoulder 77 of the cam 76, brushes 27 to 31 rest on dead segments 117 of distributor 26, and a circuit is completed at this time from ground through battery B, conductor 118, stop contact 62 of distributor 60, brushes 66 and 65, ring 64 conductor 68 the closed start-stop contacts of keyboard 104 to the remote stations and ground. This is the stop condition and the apparatus is at rest at each station.

It will be assumed for purposes of illustration that the operator desires to transmit signals 4 star 5, and 18 from the transmitter "A". In order to transmit this combination of signals the code wheels will be moved in any well known manner to the position shown in the drawings in which the numeral 4 of the first wheel, the star of the second wheel, the numeral 5 of the third wheel, and the numeral 18 of the fourth wheel are moved to the stop bar as shown. As a result the code sectors 14 are set to the positions shown bringing the proper combinations of contacts 15 into engagement with brushes 16.

Having moved the code wheels or dials to their proper positions which in turn have po-

sitioned the code sectors 14, the operator can check the message set up along the stop bar 2, and will then rotate the start lever 101 about its pivot 102 to close contacts 99. Upon closure of the contacts 99, a circuit is completed from ground through the winding of the magnet 79 over the conductor 98 and through the contacts 99, conductor 100 and thru the battery 96 to ground. As a result of this circuit, magnet 79 is energized and moves its armature 78 out of engagement with shoulder 77 of the cam 76. As the armature 78 is thus removed from engagement with its shoulder 77, the shaft 69 is released to be driven by motor 75 through the clutch disc 71, and as shaft 69 is driven, shafts 84 and 34 will be advanced step by step. Brushes 27 to 31 are at this time engaged with dead segments 117.

During the first few rotations of shaft 69 and until the mechanism picks up the proper speed, brushes 27 to 31 will be on dead contacts 117 and during this interval contacts 55 to 59 of distributor 60 will be dead and distributor 60 will transmit a series of blank signals preceded by a start condition and followed by a stop condition over line 68. During this period the receivers at each of the stations start into operation and fall into synchronism with each other as the successive stop and start signals are transmitted.

Upon the first rotation of shaft 34, shoulder 92' moves out of the groove 91 and contacts 95 engage. Thereafter a locking circuit is provided for magnet 79 from ground through magnet 79, conductor 97, contacts 95 and battery 96 to ground and maintains magnet 79 energized independently of start contacts 99. Simultaneously a locking circuit is provided for magnet 115 from ground through magnet 115, conductor 116 contacts 95 and battery 96 to ground. Energization of magnet 115 locks the transmitter 104 from operation during the operation of the transmitter "A".

After a predetermined revolution of shaft 69, shaft 34 will rotate sufficiently to move brushes 27 to 31 into engagement with radial segments 21 to 25 of the first code wheel. As the rotating brush 66 of the distributor 60 now engages the first segment 55, a circuit is completed from ground through battery B over conductor 18, conducting plate 17, through the right hand end conducting segment or contact 15 of the sector 14, over the brush 16 in engagement with conducting segment 15, over conductor 20, segment 21, brush 27, conductor 35, brush 45, conductor 50, the first segment 55 of the distributor 61, brushes 66 in engagement with segment 55, brush 65, ring 64, conductor 68, through the line magnets, to the receiving apparatus at the remote stations, thence to ground.

The receiving selector magnets at the remote stations are thus operated in response

to the first impulse transmitted through the brushes 16, engaged with a conducting segment. As now the brush 66 of distributor 61 moves from segment 55 to segment 56, a circuit is completed similar to that traced above, except that this circuit is now completed over the succeeding brush 16, conductor 20, through the segment 22 over conductor 51 and to the second segment 56 of the distributor brushes 66 and 65 and over the line 68 to the remote stations. In the present illustration, the second brush 16 is engaged with a non-conducting portion of sector 14 so that the second line condition will be a spacing condition. Similarly, as the brush 66 moves over segments 57, 58 and 59 of distributor 60, impulses will be transmitted in accordance with the presence or absence of conducting segments 15 on the sector 14 with which the 3rd, 4th, and 5th brushes 16 are connected. As the brush 66 passes over segments 61, 62, and 63, a no current condition or blank condition, a stop condition and a start condition will be transmitted to the line, and during this interval brushes 27 to 31 of distributor 26 will be advanced from the first group of segments 21 to 25 to the second group of these segments transferring the circuit conditions of the second set of brushes 16 to contacts 55 and 59 of distributor 60, and the cycle of operations is again repeated sending the second signal to the line.

For each revolution of shaft 69, a code combination of impulses preceded by a start condition followed by a blank condition and a stop condition is transmitted in accordance with the setting of wheels 1 and sectors 14 controlled thereby. Brushes 27 to 31 are moved step by step from one group of segments 21 to 25 to the succeeding group of radial segments and while the brushes 27 to 31 are on each group of radial segments, the distributor brush 67 makes a complete revolution to transmit code combinations of impulses over the line 68 in accordance with the setting of the wheels 1, and the corresponding characters are printed on the tape of the receiving printers 113 and 114.

At the end of a complete revolution of shaft 34 when the brushes 27 to 31 have successively come into engagement with every group of radial segments, shaft 34 has made a complete revolution and member 92' will again enter the notch 91 of disc 90 permitting contacts 95 to separate, breaking the circuit for magnet 79. Magnet 79 de-energizes permitting armature 78 to reengage shoulder 77 bringing the shaft 69 to a stop. In this manner, the apparatus is restored to normal.

If the operator desires to transmit an ordinary telegraphic message, he will operate the keys on the transmitter 104 accordingly, when the distributor 60 is in the normal position shown. For each key depressed shaft 111 will start into rotation and the contacts

105 will be closed successively for transmitting six unit code combinations of conditions each preceded by a start condition and followed by a stop condition in accordance with the particular key bar which has been operated. These code combinations are received on the printers 113 and 114 as above set forth and the corresponding characters are printed.

It will be understood by those skilled in the art that the invention is not limited particularly to the use of the apparatus shown. Various well known telegraph printers of single and multiple magnet types and various forms of single and multiple contact transmitting arrangements well known in the art may be substituted for the particular message transmitting mechanism shown, and various forms of tape or keyboard transmitters may be substituted for the wheel or dial transmitting mechanism "A." Accordingly having described preferred embodiments only of my invention, what is desired to be secured by Letters Patent and claimed as new is:

1. In a telegraph system, a plurality of transmitter devices each arranged to transmit a plurality of code signals, a single distributor, means for switching said distributor successively from one to another of said transmitters, a signaling line, and means including said distributor for successively impressing code combinations of impulses on said signaling line from each of said transmitters.

2. In a telegraph system, a plurality of transmitter devices each arranged to transmit a plurality of code signals, and a common distributor and means for successively associating said distributor with each of said transmitter devices.

3. In a telegraph system, a plurality of transmitter devices each arranged to transmit a plurality of code signals, a common distributor, and step by step means for successively associating said distributor with each of said transmitter devices.

4. In a telegraph system, a plurality of transmitter devices each comprising a complete unit for transmitting a plurality of code signals, means for conditioning said transmitter devices for transmitting predetermined code combinations of impulses, a common distributor, and means for successively associating said distributor with each of said transmitter devices.

5. In a telegraph system, a plurality of independently operable transmitter devices each comprising a complete unit for transmitting a plurality of code signals, common distributor means for conditioning said transmitter devices for transmitting code combinations of impulses, and means operative following each complete revolution of said distributor for switching said distributor from one of said transmitter devices to the succeeding transmitter device.

6. In a telegraph system, a plurality of independently operable transmitter devices each comprising a complete unit for transmitting a plurality of code signals, means for conditioning each of said transmitter devices for transmitting a predetermined code of impulses, a common distributor for all of said transmitter devices, and a step by step device operated once for each revolution of said distributor for associating said distributor successively with each of said transmitter devices.

7. In a telegraph system, a plurality of code wheels, a transmitter device individual to each of said wheels arranged to be positioned for transmitting predetermined code signals by said code wheel, a common distributor, and a rotating means for successively associating said distributor with each of said transmitters.

8. In a telegraph system, a normally non-operating distributor, means for starting said distributor into operation, and for invariably operating said distributor a predetermined number of revolutions, and means operative following the operation of said distributor for the predetermined number of revolutions for bringing said distributor again into a non-operating condition.

9. In a telegraph system, a normally non-operating transmitter apparatus, means for starting said apparatus into operation, and means for invariably transmitting a predetermined number of code combinations of impulses before bringing said transmitter apparatus to a stop.

10. In a telegraph system, transmitting means, means for conditioning said transmitting means for transmitting predetermined code combinations of impulses, said last mentioned means being arranged to be visible when in operated position, and a second transmitting means for transmitting code combinations of impulses, said second transmitting means being prevented from operating while said first transmitting means is in operation.

11. In a telegraph system, permutation code transmitting means, and means for conditioning said transmitting means, said conditioning means being continuously visible to indicate the condition of said transmitting means while said transmitting means is operated to transmit code combinations of impulses.

12. In a telegraph system, a first transmitter comprising means for setting up a message to be transmitted, a second transmitter, and means for locking said second transmitter from operation when said first transmitter is in operation.

13. In a telegraph transmitter, a first transmitter, a second transmitter, and means operative following the operation of said first transmitter for locking said second transmitter from operation.

14. In a telegraph system, a group of transmitters, means for setting up a code combination of impulses to be transmitted, a second transmitter, and means operative following the conditioning of any one of said first group of transmitters for rendering said second transmitter non-operative.
15. In a telegraph transmitter, a first transmitter, a second transmitter, means for conditioning said first transmitter for operation, and means operative an interval of time before said first transmitter becomes operative for rendering said second transmitter inoperative to transmit code combinations of impulses.
16. In a telegraph system, a first transmitter, a second transmitter, and means operative in the event that said first transmitter is operated for rendering said second transmitter non-operative.
17. In a telegraph transmitter, a plurality of code wheels, transmitting sectors connected to said code wheels and positioned in accordance with the operation of said code wheels, a common distributor, and a distributor means intermediate said common distributor and said plurality of transmitter sectors for successively associating said distributor with each of said transmitter sectors.
18. In a telegraph system, a plurality of code wheels, a transmitter individual to each of said code wheels, a rotating distributor, and a step by step rotating distributing means intermediate said distributor and said transmitters for successively associating said distributor with each of said transmitters.
19. In a telegraph system a first transmitter, a second transmitter, a distributor for said first transmitter, said distributor being normally in a non-operating condition, and means operative following the starting of said distributor into operation for rendering said second transmitter non-operative.
20. In a telegraph system, a normally-operative distributor, means for starting said distributor into operation, and means for thereafter maintaining said distributor in operation for a predetermined number of operations.
21. In a telegraph system, a five unit code transmitter, six unit code transmitter, and a common receiver responsive to said code combinations of impulses from each of said transmitters.
22. In a telegraph system, a code transmitter, a second transmitter arranged to transmit code combinations of a different number of impulses than that of said first transmitter, and a common automatic receiver responsive to said code combinations of impulses from each of said transmitters.
23. In a telegraph system, a six unit code transmitter, a five unit code transmitter, a common signaling line for said transmitters, and means for translating the code combination of impulses from said five unit code transmitter to a six unit code.
24. In a telegraph system, a code transmitter, a second code transmitter of a different code than said first transmitter, a common signaling line, and means for translating the code of said first transmitter to that of said second transmitter, and a common receiver responsive to the code combinations of impulses from both said transmitters.
25. In a signaling system, a plurality of dial type transmitters, transmitter sectors controlled by said dial type transmitters, a set of brushes individual to and in operative relation with each of said sectors, a distributor having a radial set of segments individual to each set of brushes, said brushes being electrically connected thereto, a set of rings, each ring being common to a plurality of segments, one in each radial group, a second distributor comprising a segment individual to each of said rings and connected thereto, means for rotating said second distributor and a connection between said means and said first distributor for rotating said first distributor at a speed such that the brushes thereof move over one of said radial sectors to the succeeding radial sector for each revolution of said second distributor, a second telegraph transmitter comprising a key board and a set of contacts selectively controlled thereby, a signaling line connected to said transmitter, and means for rendering one of said transmitters non-operative while said other transmitter operates.
26. In a signaling system, a plurality of dial type transmitters, transmitter sectors controlled by said dial type transmitters, a set of brushes individual to and in operative relation with each of said sectors, a distributor having a radial set of segments individual to each set of brushes, said brushes being electrically connected thereto, a set of rings, each ring being common to a plurality of segments, one in each radial group, a second distributor comprising a segment individual to each of said rings and connected thereto, means for rotating said second distributor and a connection between said means and said first distributor for rotating said first distributor at a speed such that the brushes thereof move over one of said radial sectors to the succeeding radial sector for each revolution of said second distributor, a second telegraph transmitter comprising a key board, and a set of contacts selectively controlled thereby, electromagnetic means, a contact periodically operated as said second distributor is rotated, said contact being electrically connected to said electromagnetic means for controlling its energization, said electromagnetic means when energized being arranged to lock said key board in non-operated condition whereby only one of said transmitters

is operative at one time, and a common signaling line for said transmitter.

27. In a signaling system, a plurality of dial type transmitters, transmitter sectors controlled by said dial type transmitters, a distributor having a radial set of segments individual to each transmitter sector, a second distributor comprising a segment common to a plurality of segments, one in each radial set, means for rotating said second distributor, and a connection between said means and said first distributor for rotating said first distributor at a speed such that the brushes thereof move over one of said radial sectors to the succeeding radial sector for each revolution of said second distributor.

28. In a signaling system, a plurality of dial type transmitters, transmitter sectors controlled by said dial type transmitters, a distributor having a radial set of segments individual to each transmitter sector, a second distributor comprising a segment common to a plurality of segments, one in each radial set, means for rotating said second distributor and a connection between said means and said first distributor for rotating said first distributor at a speed such that the brushes thereof move over one of said radial sectors to the succeeding radial sector for each revolution of said second distributor, a second telegraph transmitter comprising a key board and a set of contacts selectively controlled thereby, and a common signaling line therefor.

29. In a signaling system, a plurality of dial type transmitters, transmitter sectors controlled by said dial type transmitters, a distributor having a radial set of segments individual to each transmitter sector, a second distributor comprising a segment common to a plurality of segments, one in each radial set, means for rotating said second distributor, and a connection between said means and said first distributor for rotating said first distributor at a speed such that the brushes thereof move over one of said radial sectors to the succeeding radial sector for each revolution of said second distributor, a second telegraph transmitter comprising a key board and a set of contacts selectively controlled thereby, electromagnetic means, a contact periodically operated as said second distributor is rotated, said contact being electrically connected to said electromagnetic means for controlling its energization, said electromagnetic means when energized being arranged to lock said key board in non-operated condition whereby only one of said transmitters is operative at one time.

30. In a signaling system, a plurality of dial type transmitters, transmitter sectors controlled by said dial type transmitters, a distributor having a radial set of segments individual to each transmitter sector, a sec-

ond distributor comprising a segment common to a plurality of segments, one in each radial set, means for rotating said second distributor and a connection between said means and said first distributor for rotating said first distributor at a speed such that the brushes thereof move over one of said radial sectors to the succeeding radial sector for each revolution of said second distributor, a second telegraph transmitter comprising a key board and a set of contacts selectively controlled thereby, electromagnetic means, a contactor periodically operated as said second distributor is rotated, said contact being electrically connected to said electromagnetic means for controlling its energization, said electromagnetic means when energized being arranged to lock said key board in non-operated condition whereby only one of said transmitters is operative at one time, a second electromagnetic means for controlling said connection from said driving means to said second distributor, a second contactor, manually operated means for operating said second contactor, said second contactor being electrically connected to said second electromagnetic means for energizing said second electromagnetic means, said second electromagnetic means being connected in multiple to said first contactor for energization thereby, a signaling line extending from said transmitters to a remote station, and receiving apparatus at said remote station variably operated in accordance with code combinations transmitted thereover.

31. In a telegraph system, a telegraph circuit, means to transmit a series of groups of permutation code signals over said circuit, and automatic means to stop the transmitting means only at the end of a predetermined group of code signals constituting a single message.

32. In a transmitting system, a distributor, means for transmitting code combinations of impulses of complete messages over said distributor, means for bringing said distributor to a stop at a predetermined position thereof, and means whereby said last mentioned means is operated only at the end of the transmission of a completed message over said distributor.

33. In a transmitter, rotating distributor, means for transmitting successive code combinations of impulses over said distributor, said code combinations of impulses being invariably transmitted in a predetermined sequence, and means controlled by said distributor for controlling said sequence of transmission of said code.

34. In a telegraph system, a telegraph circuit, means to transmit over said circuit a series of groups of permutation code signals, each group representing a complete message,

and automatic means to stop said means invariably at the end of each single message.

35. In a telegraph signaling system, a transmitting distributor, a plurality of groups of signal controlling elements; means to render said controlling elements effective in accordance with varying permutations of signaling conditions to be transmitted, a group of impulse controlling elements; and means controlled by said distributor to operatively associate said first mentioned elements with said second mentioned elements to effect the transmission of signals in accordance with the setting of said first mentioned elements.

36. In a telegraph system, means for establishing circuits and code combinations of signal impulses representative of component parts of a message, means operative subsequently to the establishment of a plurality of groups of circuits for simultaneously completing the circuits for each component part of the message successively, a line, and means for impressing the impulses representative of each component part of the message on the line successively.

37. In a telegraph system, a transmitter, a group of elements operated by the transmitter in accordance with each component part of a message, means operating subsequently to the establishment of a plurality of groups of circuits for rendering all elements of a group effective simultaneously and the groups effective successively, a line, and means for transmitting over the line successively impulses representative of the elements rendered effective simultaneously by said means.

38. In a telegraph system, a telegraph circuit, means to establish circuits representative of a plurality of groups of permutation code signals, means operative subsequently to the establishment of a plurality of groups of circuits to complete successively the circuits of the several groups, and means for successively transmitting over said telegraph circuit the code signals of each group.

In testimony whereof I affix my signature.

HOWARD L. KRUM.

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CERTIFICATE OF CORRECTION.

Patent No. 1,864,074.

June 21, 1932.

HOWARD L. KRUM.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 82, for "8" read 7; and page 6, line 45, claim 2, for "operative" read non-operative; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of October, A. D. 1935.

Leslie Frazer
Acting Commissioner of Patents.

(Seal)