

March 19, 1946.

J. A. SPENCER

2,397,058

SINGLE CHANNEL SECRECY DEVICE

Filed March 15, 1943

2 Sheets-Sheet 1

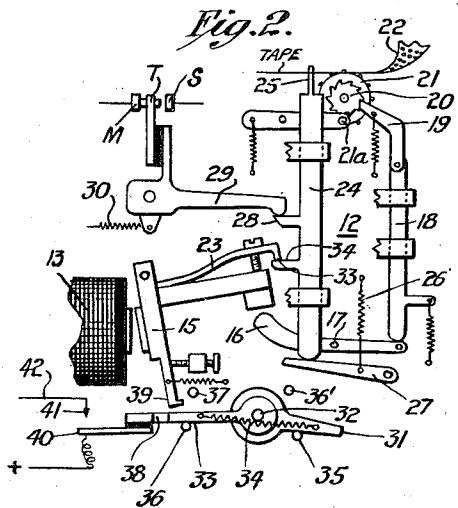
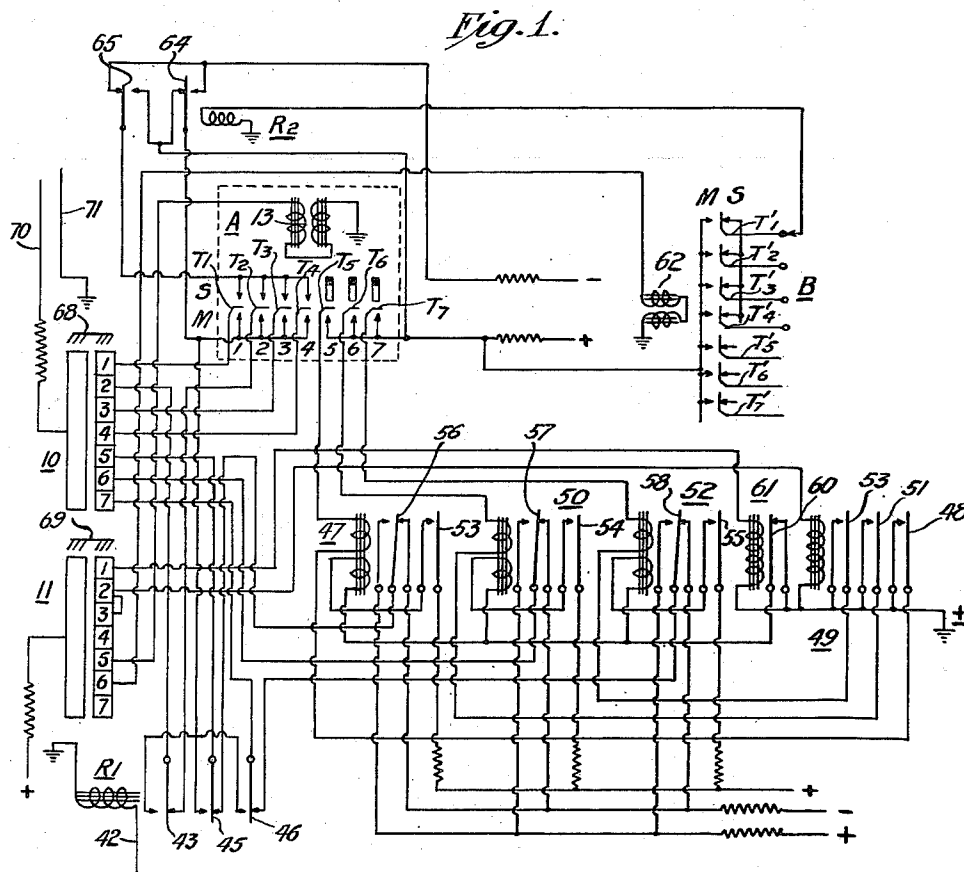


Fig. 4.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	0	0	0	0										0	0						0	0	0	0	0	0
2	0							0	0			0	0	0	0	0	0			0	0	0				
3	0	0								0			0	0	0				0	0			0			0
4	0			0	0	0				0	0	0					0	0						0		
5			0	0	0					0	0	0	0		0	0						0				
6		0		0	0	0	0	0	0								0	0	0	0		0		0	0	0
7	0					0				0							0	0	0				0	0	0	0

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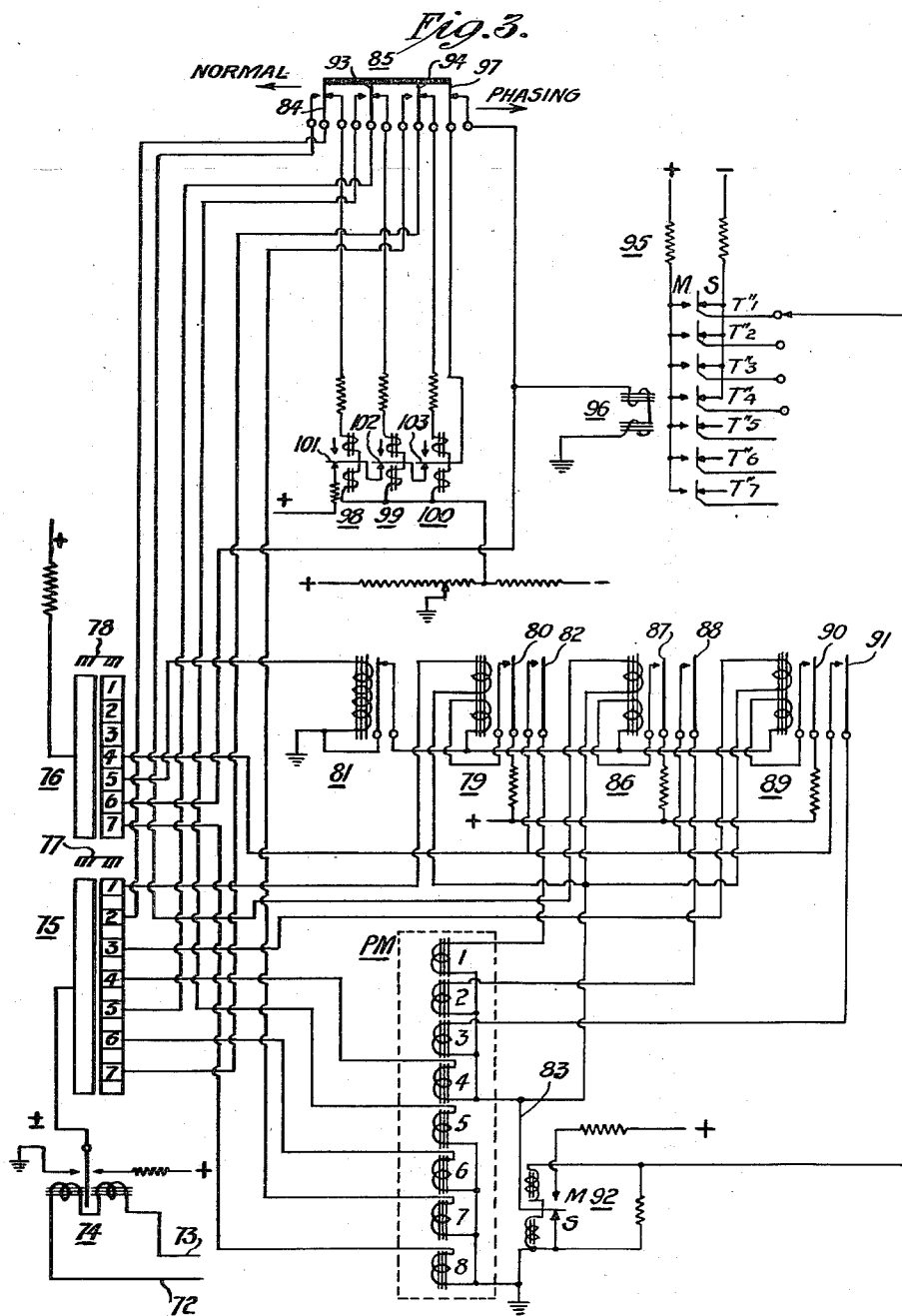
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SINGLE CHANNEL SECRECY DEVICE

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2 Sheets-Sheet 2



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2,397,058

SINGLE CHANNEL SECRECY DEVICE

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Application March 15, 1943, Serial No. 479,179

8 Claims. (Cl. 178—22)

This invention relates to secrecy system for telegraph communication, either wire or radio.

In my co-pending application filed March 5, 1943, Serial No. 478,065, I have disclosed a secrecy system applied to multi-channel circuits, in which the tape transmitter and the printer for one channel are operated during the time assigned to another channel. In single channel systems, special provision must be made for storing some of the signal units while the tape transmitter and printer are being operated; otherwise, the full channel time cannot be utilized for transmission of the signals. Such a system is disclosed, for example, in my co-pending application filed September 17, 1940, Serial No. 357,109, now Patent No. 2,327,075, granted August 17, 1943, and I have disclosed my present improvement in combination therewith.

It is an object of this invention to provide a secrecy device operating at random, with provisions for storing units of a code character while the tape transmitter and receiving printer are being operated.

Another object of the invention is to provide a random signal reverser for a single channel printing circuit utilizing storage means to permit signaling during the entire channel time.

Another object of the invention is to provide a phasing device for a secrecy system automatically operable by means of a prearranged code.

Another object of the invention is to provide tape-operated devices for random reversing of the signals cooperating with signal storing means, so that full channel time may be utilized for signal transmission and recording.

Other objects will appear in the following specification, reference being had to the drawings, in which:

Figure 1 diagrammatically illustrates the transmission circuits of my invention.

Figure 2 is a schematic illustration of the tape transmitter.

Figure 3 diagrammatically illustrates the circuits of my invention at the printing or recording station.

Figure 4 shows a seven unit code diagram.

Referring to Fig. 1, reference character 10 represents generally the signal distributor having solid and segmented rings, while 11 indicates generally a similar distributor for performing the local functions of the station, which in this case is the operation of tape transmitters in Fig. 2.

The tape transmitter has an operating magnet 13 with a pivoted armature 15. When moved downwards a certain distance, this armature en-

gages a lever 16 pivoted at 17 and moves ratchet bar 18 upwards, which causes the pivoted dog 19 to engage and move the ratchet wheel 20 secured to a pinwheel 21. The pins of this wheel engage the driving holes in the perforated tape 22 and step it forward one code unit each time the armature 15 is moved by energization of magnet 13. Spring-pressed roller catch 21a holds this movement. Armature 15 also operates the seeker bars 24 through an extension 23, one seeker bar only being visible in Fig. 2. Since I have chosen to illustrate my invention in a seven unit code system, there are seven of these bars 24 closely spaced to position the round pins 25 against the tape, under pressure of spring 26 operating through levers 27. Each of the seven seeker bars has its own elevating lever 27 and spring 26, so that they are pressed independently against the tape. Each seeker bar also has a lug 28 engaging its switch lever 29, which moves the cooperating tongue T against either a marking contact M or a spacing contact S under action of spring 30, depending upon the position of the seeker bars. There are, of course, seven of these tongues and they are designated as T₁, T₂, T₃, T₄, T₅, T₆ and T₇ in Fig. 1.

Since provision must be made for stopping and starting the tape transmitter from time to time, special means are provided for this purpose. This consists of a thumb lever 31 pivoted at 32, on which is also independently pivoted a lock arm 33. Spring 34 has one end fastened to lever 31 and the other end fastened to lock arm 33. The spring, when on one side of the center, as shown in Fig. 2, positions thumb lever 31 and lock arm 33 against stop pins 35 and 36, respectively.

When the thumb lever 31 is moved clockwise against stop 36', the spring 34 passes dead center and snaps the lever 33 against stop 37, if the magnet 13 happens to be energized at the time. In such position the slot 38 in lock arm 33 passes over the hooked extension 39 of the armature 15. When the magnet is de-energized, the hook slips under the slot wall. This locks both the armature and arm 33. However, if the magnet 13 does not happen to be energized when thumb lever 31 is moved as described, the lock arm 33 snaps against the end of extension 39. When the magnet 13 is next energized and the armature is attracted, the lock arm moves against stop pin 37 with the same result. When thumb lever 31 is moved clockwise to unlock the armature, the armature cannot release until the magnet 13 is next energized and the hook pulled slightly to the left in Fig. 2. Thus, the transmitter is locked and

unlocked at a definite time in the code cycle, as will be later explained in detail.

In the locked position of the transmitter, the switch blade 40 engages the contact 41, which places positive potential on conductor 42 connected to relay R₁ (Fig. 1).

Since the tape transmitter is a prior art structure, it has been shown in somewhat diagrammatic form, so that its method of operation will be more quickly grasped.

Referring now to Fig. 1, the usual message transmitter A is shown diagrammatically, but its construction is like that shown in Fig. 2. The tongues T₁, T₃ and T₄ of this message tape transmitter are connected directly to the segments Nos. 1, 3 and 4 of the distributor 10, but tongue T₂ is connected to segment No. 2 of this distributor through tongue 43 of relay R₁ and its cooperating break contact. This relay also has two additional tongues 45 and 46 engaging break contacts connected to the negative terminal through contacts of another relay, to be later referred to. The make contacts of this relay are all connected to the mark bus bar of the first four contacts of transmitter A. Tongue T₅ is connected to one terminal of the coil of storing relay 47, the other terminal of this coil being connected to ground through tongue 48 of relay 49 and its cooperating make contact. Tongue T₆ of the tape transmitter is connected to one terminal of the coil of storing relay 50, the other terminal of which is connected to ground through tongue 51 of relay 49 and the cooperating make contact. Tongue T₇ of the tape transmitter is connected to one terminal of the coil of storing relay 52, the other terminal of which is connected to ground through the tongue of relay 49 and the associated make contact.

Relays 47, 50 and 52 have holding coils connected to the positive terminal through their make contacts 53, 54 and 55, respectively. The other terminals of these coils are connected to ground through break contacts 60 of relay 61. The remaining make and break contacts associated with the tongues of relays 47, 50 and 52 are connected respectively to positive and negative potential.

Segments Nos. 5 and 7 of distributor 10 are not joined to tongues T₅ and T₇, but are connected to tongues 56 and 58 of relays 47 and 52, respectively, through tongues 45 and 46 of relay R₁. Segment No. 6 is not connected to tongue T₆, but to tongue 57 of relay 50.

Referring now to distributor 11, segments Nos. 1 and 2 are connected to ground through the coils of relays 61 and 49, respectively. Segment No. 3 is preferably connected to segment No. 2 to increase the length of time available for energization of the coil of relay 49, but this is not a requirement. Segment No. 5 is connected to ground through the coil of the operating magnet 13 of the tape transmitter A. Segment No. 6 is connected to ground through the coil of the operating magnet 62 of the transmitter B. Tape transmitter B has the same general construction as shown in Fig. 2 and is used to reverse the first four signal units at random for secrecy purposes, as later explained in detail. The function of the relays 47, 50 and 52 is to store the fifth, sixth and seventh signal units so that they will not be destroyed when the tape is advanced to a new position upon the brushes reaching segment No. 5.

The mark contacts on tape transmitter A are connected differently from the transmitter in my said co-pending application, Serial No. 357,103,

so as to provide for random signal reversals by transmitter B. Mark contacts Nos. 1, 2, 3 and 4 are connected to the tongue 64 of relay R₂, while mark contacts Nos. 5, 6 and 7 are connected to the positive terminal. The space contacts Nos. 1, 2, 3 and 4 are connected to the tongue 65 of this relay, but space contacts Nos. 5, 6 and 7 are blank, as in my last-mentioned co-pending application. The break and make contacts cooperating with tongues 64 and 65, respectively, are connected to the negative terminal, while the make and break contacts respectively engaging such tongues are connected to the positive terminal. The coil of relay R₂ is shown connected between ground and the tongue T'₁ of transmitter B, but it may be connected to T'₂, T'₃ or T'₄.

The mark contacts of transmitter B are connected to the positive terminal. Contacts engaging tongues T'₁, T'₂, T'₃ and T'₄ are connected to the negative terminal and the other space contacts are left blank.

Brushes 68 and 69 are mechanically connected together or otherwise arranged to rotate at the same speed and in the same phase over the solid and segmented rings of distributors 10 and 11, respectively. These brushes connect segments Nos. 1 to 7 to their solid rings, as will be understood. The solid ring of distributor 11 is connected to positive potential and the solid ring of distributor 10 is connected to one outgoing line 70, the other outgoing line 71 being grounded. These lines may connect to suitable radio transmitting devices for radio uses or they may be connected to devices for wire transmission, as my invention is applicable for either use.

Referring to Fig. 3, the incoming signals are received over lines 72, 73, which may be understood to come either from a radio or a wire station, as previously indicated, and for purposes of explanation it may be assumed that the signals in these wires are plus and minus pulses corresponding to the plus and minus pulses sent out over the transmission wires 70 and 71. The incoming wires are connected to the coil of polar line relay 74, having one of its contacts connected to the positive terminal and the other one connected to ground, which is the plus and minus terminal. The tongue of relay 74 is connected to the solid ring of distributor 75. The solid ring of local function distributor 76 is connected to positive potential and brushes 77, 78 are mechanically joined or are otherwise made to rotate together and they also rotate in synchronism and phase with the brushes at the transmitting station, by means well known in the art, not shown.

Segment No. 1 of distributor 75 is connected through the operating coil of relay 79 to the conductor 83, which relay has a tongue 80 closing through its make contact a holding circuit for the relay. This holding circuit may be traced from positive potential through the holding coil and the break contacts of relay 81 to the ground terminal. Relay 79 has a tongue 82 connected to one terminal of the No. 1 printer selector magnet, the other terminal of which is connected to conductor 83. The printer magnets are indicated as a whole by reference character PM. The make contact cooperating with tongue 82 is connected to the fourth segment of the local function distributor 76. No. 2 segment on distributor 75 is connected to tongue 84 of a multi-contact phasing switch 85. The make contact cooperating with this tongue is connected to ground through the operating coil of relay 86. Switch tongue 87 of this relay engages its make contact when the op-

erating coil is energized and closes the circuit through its holding coil from the positive terminal to the break switch of relay 81. This relay has a second tongue 88 adapted to engage its make contact to close the circuit from the fourth segment of distributor 76 through No. 2 printing magnet to the conductor 83.

No. 3 contact of distributor 75 is connected to one terminal of the operating coil of relay 89, the other terminal being connected to conductor 83. This relay has a tongue 90 adapted to engage a make contact, which closes the circuit from the positive terminal through a holding coil through the break switch of relay 81. The relay 89 also has another tongue 91 adapted to engage its make contact and close the circuit from the fourth segment of distributor 76 through the No. 3 printing magnet to the common conductor 83. The fourth segment of distributor 75 is connected through the fourth printing magnet to the conductor 83.

The common conductor 83 connected to the first, second, third and fourth printing magnets PM is connected to the tongue of polarized relay 92. The mark contact M of this relay is connected to the positive terminal and the space contact S is connected to ground.

The fifth segment of distributor 75 is connected to switch tongue 93 of phasing switch 85 and the make contact cooperating with this tongue is connected through the fifth printing magnet to ground. No. 6 segment of distributor 75 is connected through the sixth printing magnet to ground. The seventh segment of distributor 75 is connected to tongue 94 of phasing switch 85 and the make contact cooperating therewith is connected through the seventh printing magnet to ground. The eighth pulse printing magnet is connected between the seventh segment of distributor 76 and ground.

The operating coil of relay 92 is shown connected to tongue T'¹ of a decoding or reversing tape transmitter C, but it may be connected to T'², T'³ or T'⁴, and it must have the same adjustment as tape transmitter B at the transmitting station. The mark contacts M of tape transmitter C are all connected to the positive terminal and the space contacts S cooperating with tongues T'¹, T'², T'³ and T'⁴ are all joined to the negative terminal. The other space contacts and tongues T'⁵, T'⁶ and T'⁷ take no part in the operation and are blank.

The coil of the operating magnet 96 of tape transmitter C has one terminal connected to ground and the other one connected to the break contact cooperating with tongue 97 of phasing relay 85. The break contacts cooperating with tongue 84, 93 and 94 are connected to a point intermediate between the negative terminal and ground through the coils of polar relays 98, 99 and 100, respectively. The reason for this intermediate tap is to cause positive and negative current flow when the tongue of relay 74 is on the plus and ground contacts, respectively. These three relays, as well as the other polar relays, are designed so that their tongues remain on a contact until thrown in the opposite direction by current of the opposite polarity. When energized with positive current, the relays 98, 99 and 100 engage their lower contacts and apply positive potential to the tongue 97 of phasing switch 85 through the switch tongues 101, 102, 103 of these relays in series. When energized by negative current, they move against their blank upper contacts.

The break contact cooperating with tongues 97

of phasing switch 85 is connected to the sixth segment of local function distributor 76, so that potential is applied to the operating magnet 95 of tape transmitter C both by the No. 6 segment and by the phasing switch, as will later be explained in detail. The transmitter C has the general construction shown in Fig. 2, but neither it nor transmitter B has any connections extending from the switch contacts 40, 41. These are utilized only in the transmitter A.

The operation of my invention will now be described:

Before regular transmission of messages can begin, it is necessary to phase the B and C transmitters so that they have the perforations of the same code characters over the seeker pins at the same time. All three transmitters are manually locked, as described in connection with Fig. 2. The message tape is placed in the A tape transmitter and continuous belts of identically perforated tape will be placed in the B and C transmitters. To perform the phasing operation, the B and C tapes are placed in position so that they have the same character in position over the seeker pins, which character has a perforation in the position in which a tongue is connected to relays R₂ and 92, respectively. As shown in Fig. 1, this would mean a perforation in the first code unit. By referring to the code diagram of Fig. 4, it will be seen that the B and C transmitters may have in starting position either the letter "A," "C," "D," "F," "M," "O," "T," "U," "W," "Y" or "Z." Suppose, for example, that the B and C tapes are set with the perforations of the letter "Z" over the seeker pins. The locking of the A tape transmitter on space closes switch 40-41 (Fig. 2) and energizes relay R₁. The three tongues of this relay then swing from the break contacts to the make contacts. This places positive potential on segments Nos. 2, 5 and 7 through the contacts of relay R₂. Locking of the B tape transmitter on space de-energizes relay R₂ and the locking of the C transmitter on space at the receiver places negative current through relay 92, which moves its tongue on the ground contact.

As the brushes rotate over the segments of the distributors, positive signal pulses go out over the lines 70, 71 in positions 2, 5 and 7 of the distributor time cycle and negative pulses through tongue 65 in time positions 1, 3 and 4. Negative pulses also go out in position 6 through the back contacts of relay 50. This is the idle time signal for the usual seven unit code, as disclosed in my said patent. These idle time signals are used for phasing the B and C transmitters, as will now be explained.

To accomplish the phasing, the receiving operator will throw the phasing switch 85 from "normal" to "phasing" in Fig. 3. The idle time signals now energize the polar relays 98, 99 and 100 with the mark pulses and their tongues connect the magnet 96 of the C transmitter to positive potential through tongue 97 of the phasing switch 85. The C transmitter is now locked electromagnetically by its operating magnet 62 (being identical with magnet 13 of Fig. 2) and its manual lock 34 is thrown clockwise against pin 35 (Fig. 2). Since the operating magnet is energized, the locking arm 33 moves free of the hooked end 39 and against pin 36.

The selector relays and the printing magnet are not operated by these idle time signals, as ground potential appears at both terminals of the coils in time positions 1, 3, 4 and 6 and current is

shunted through the phasing circuit in time positions 2, 5 and 7.

The transmitting operator then releases at any time thereafter the manual lock on the B transmitter, but not the one on the A transmitter. The B transmitter remains locked because hooked end 39 prevents the lever 33 from moving. When segment No. 6 is reached, magnet 62 is energized and the hooked end moves slightly, which permits the lever 33 to move to release position against pin 36. Tongue T'1 now is positive by engaging its mark contact and relay R₂ is energized. This reverses the first four signal units and when segment No. 2 is reached by the brushes, negative current in relay 98 opens the circuit of magnet 96 of the C transmitter and it unlocks. The B and C tapes are now properly phased. When the brushes reach segments Nos. 5 and 6 in succeeding cycles, magnets 96 and 62 of the C and B transmitters, respectively, are energized and the tapes are thereafter advanced in unison.

The receiving operator now snaps the phasing switch to "normal" and the transmitting operator releases the manual lock on the A transmitter any time thereafter, which deenergizes relay R₁ and the segments Nos. 2, 5 and 7 of distributor 10 are connected to their normal message circuits.

It will be seen that whenever relay R₂ is energized, positive current will be transmitted on space for the first four code units and negative current on mark. That is, the signals will be reversed in the first four positions, but not in the fifth, sixth and seventh positions; but when relay R₂ is de-energized, positive current will be sent out on mark and negative current on space in the first four time positions, the other positions being normal as before. This will be normal transmission with no reversal of the signals.

By an inspection of the B transmitter, as shown in Fig. 1, and referring to the code in Fig. 4, it will be seen that the relay R₂ will be energized and the signals reversed when the perforations of the letters "A," "C," "D," "F," "M," "O," "T," "U," "W," "Y" and "Z" are in position over the seeker pins of the B transmitter and not reversed when the perforations of the other letters of the alphabet are in position thereover. Since the C transmitter is identical and in phase with the B transmitter, an inspection of the circuits completed by the C transmitter and the relay 92 will show that the reversed signals sent out by the transmitting station will again be reversed, or righted, and normal printing will occur. With the perforations of the other letters of the alphabet appearing over the seeker pins in the C transmitter, the relay 92 will be operated in the opposite direction and the normal signals sent out by the transmitting station will operate the printing magnets in a normal manner.

Thus, the first four code unit pulses sent out by the A transmitter are scrambled at random by the continuous belt of tape in the B transmitter, but the signals are correctly printed or otherwise recorded at the receiver, due to the action of the C transmitter. An unauthorized receiver, however, will not be able to translate the garbled transmission.

A description of the action of the storing relays 47, 53 and 52 at the transmitter and 79, 85 and 89 at the receiver need not be given in detail, as the action is the same as set forth in my said co-pending application, except as modified by my present improvement, which has been fully described.

The operation of the system when the coils of relays R₂ and 92 of the B and C transmitters are adjusted to connect with other than the first tongues will be apparent without description.

It will be apparent that the perforations in the scrambling and unscrambling tapes may be made in accordance with any predetermined order of characters, as in a word or series of words, or even a fanciful arrangement of perforations of any sort may be used.

Various modifications may be made in the improvement without departing from the spirit of the invention.

Having described my invention, what I claim is:

1. In secrecy devices for multi-unit equal length code signal systems, a transmission circuit, a message and a scrambling tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for connecting the switch tongues of the message transmitting successively to said transmission circuit, a reversing switch for reversing the polarity of the contacts of said message transmitter and means for controlling said reversing switch by the engagement of one of the tongues of the scrambling transmitter with a predetermined one of its contacts.
2. In secrecy devices for multi-unit equal length code signal systems, a transmission circuit, a message and a scrambling tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for connecting the switch tongues of the message transmitter successively to said transmission circuit, a reversing switch for reversing the polarity of the contacts of said message transmitter, electromagnetic means connected to a switch tongue of the scrambling transmitter for controlling said reversing switch by the engagement of said tongue with a predetermined one of said contacts, means for shifting the connection of said means from one tongue to another and means for advancing the tape of the scrambling transmitter once each code character cycle.
3. In a multi-unit single channel system, a message and a scrambling tape transmitter, each having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for advancing the tape of the message tape transmitter before the last units of the code cycle are transmitted, means for storing the said last units before the said tape is thus advanced, a reversing switch connecting potential terminals to the contacts that produce the unstored signal units of the message transmitter and means controlled by the engagement of one tongue of the scrambling tape transmitter with one of said contacts for operating said reversing switch.
4. In a multi-unit single channel system, a message, a scrambling and a receiving tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for advancing the tapes of said transmitters once each cycle, means for storing the signal units set up by the message tape for transmission after the tape is thus advanced, means including a reversing switch for connecting potential to the contacts that produce the unstored signal units of the message transmitter, a coil for said reversing switch adapted when energized to reverse the po-

tentials applied to the said contacts and means for connecting said coil to one of the tongues of the scrambling transmitter for energization on its engaging a mark contact.

5. In a multi-unit single channel system, a message, a scrambling and a receiving tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for advancing the tapes of said transmitters once each cycle, means including a reversing switch for connecting potential to contacts of the message transmitter, a coil adapted when energized to operate said switch and reverse the potentials applied to the said contacts, means for connecting said coil to a selected tongue of the scrambling transmitter for energization upon its engaging a mark contact, means for locking said transmitters on their space contacts and releasing them at a predetermined time in the code cycle, means for sending predetermined signals when the message and scrambling transmitters are thus locked and auxiliary means operated by said predetermined signals for locking the receiving tape transmitter and for releasing the same after the unlocking of the scrambling transmitter and upon the engagement of said selected tongue with a mark contact.

6. In a multi-unit single channel system, a message, a scrambling and a receiving tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for advancing the tapes of said transmitters once each cycle, means for storing the signal units set up by the message tape for transmission after the tape is thus advanced, means including a reversing switch for connecting potential to the contacts that produce the unstored signal units of the message transmitter, a coil adapted when energized to operate said switch and reverse the potentials applied to the said contacts, means for connecting said coil to a selected tongue of the scrambling transmitter for energization upon its engaging a mark contact, means for locking said transmitters on their space contacts and releasing them at a predetermined time in the code cycle, means for sending predetermined signals when the message and scrambling transmitters are thus locked and auxiliary means operated by said predetermined signals for locking the receiving tape transmitter and for releasing the same after the unlocking of the scrambling transmitter and upon the engagement of said selected tongue with a mark contact.

7. In a multi-unit single channel system, a message, a scrambling and a receiving tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for advancing the tapes of said transmitters once each cycle, means including a reversing switch for connecting potential to contacts of the message transmitter, a coil adapted when energized to operate said switch and reverse the potentials applied to the said contacts, means for connecting said coil to a selected tongue of the scrambling transmitter for energization upon its engaging a mark contact, means for locking said transmitters on their space contacts and releasing them at a predetermined time in the code cycle, means for sending predetermined signals when the message and scrambling transmitters are thus locked, auxiliary means operated by said predetermined signals for locking the receiving tape transmitter and for releasing the same after the unlocking of the scrambling transmitter and upon the engagement of said selected tongue with a mark contact and means controlled by the receiving transmitter for reversing the received signals as a selected one of its tongues moves from one contact to another.

8. In a multi-unit single channel system, a message, a scrambling and a receiving tape transmitter having a plurality of pairs of juxtaposed contacts and movable switch tongues adapted to separately engage the contacts of said pairs, means for advancing the tapes of said transmitters once each cycle, means for storing the signal units set up by the message tape for transmission after the tape is thus advanced, means including a reversing switch for connecting potential to the contacts that produce the unstored signal units of the message transmitter, a coil adapted when energized to operate said switch and reverse the potentials applied to the said contacts, means for connecting said coil to a selected tongue of the scrambling transmitter for energization upon its engaging a mark contact, means for locking said transmitters on their space contacts and releasing them at a predetermined time in the code cycle, means for sending predetermined signals for locking the receiving tape transmitter and for releasing the same after the unlocking of the scrambling transmitter and upon engagement of said selected tongue with a mark contact and means controlled by the receiving transmitter for reversing received signals as a selected one of its tongues moves from one contact to another.

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