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This invention relates to the addition of certain devices and methods to printing telegraph systems for the purpose of enciphering the message.

This invention relates to the addition of certain devices and methods to printing telegraph systems for the purpose of automatically enciphering and deciphering the message.

One object of this invention is to provide features which make it possible to insert a cipher on the transmitted message of that machine known as the Teletype and manufactured by the Morkrum Company, Chicago, Illinois. The device is such that while the line impulses will thereby be in cipher a similar device at the receiving station will automatically decipher the message and present a legible reproduction.

While this description will necessarily be restricted to a specific case of application it is desired to cover use of the same methods in any telegraph system printing or manual, over lines or by radio, using unindirectional currents for actutation of instruments at a receiving station, with or without distributing devices.

With reference to figure 1, a teletype transmitter is diagrammed in phase electrically with a tape transmitter. Means are provided for stepping forward the tape mechanism of the tape transmitter or transmitters by some such circuit as shown dotted under the control at the proper time by the distributor.

Magnet M, figure 1, is a differentially wound magnet, the characteristic of which is that current of the same value in both windings sets up a core flux in opposition in each pertaining part of the core which tends to neutralize each other and aramature 3 remain stationary. Current in one winding or the other individually will however actuate armature 3. Magnet 3 may be directly placed on the Teletype machine in place of the Teletype coils and print a local cipher message or may be used to actuate a cipher tape perforator which tape could be transmitted subsequently.

With reference to figure 2, A is a sending station and B is a receiving station. A Teletype transmitter is in phase electrically with a tape transmitter at the sending station. Again a tape transmitter is in phase with a receiving printer at the receiving station. At the sending station relay 6 is controlled by the tape transmitter while relay 7 is controlled by the Teletype transmitter. The armatures action of these relays in joint operation with contacts wired as shown is a product of both relays and therefore line continuity is a product of the action of the tape transmitter and the Teletype transmitter at any instant. 8 is Teletype receiver coils which will print a legible result of only the Teletype transmitters action. It will therefore be seen that in transmitting letter A (number one and two electrical impulse) with a cipher addition from the tape transmitter of say letter N (number three and four impulses, contact, or pin, the line resultant through the differential coil will be seen to be

Operate by any method known for any of

Two channels absolutely necessary.

Approved for Release by NSA on 09-12-2013 pursuant to E.O. 13526

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	1	2	3	4	5	
Sending	+	+	0	0	0	Teletype transmitting A
	0	0	+	+	0	Tape cipher transmitting N
	+	+	+	+	0	Line resultant K

Now it shall be understood that at the receiving station a duplicate cipher tape is used in phase with the line resultant. Then

	1	2	3	4	5	
Receiving	+	+	+	+	0	Line resultant K
	0	0	+	+	0	Tape cipher N
	+	+	0	0	0	Resultant A

Therefore an A has been transmitted and received while the line current may be anything other than an A.

With reference to figure3, it is desired to cover identical action in using a differential relay whose differential windings are connected as shown for the sending station and may be correctly used for the receiving station by having a similar connection with #12 windings in the line circuit.

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Signed Louis M. Coons

Signed George A. Graham

Signed William F. Friedman