

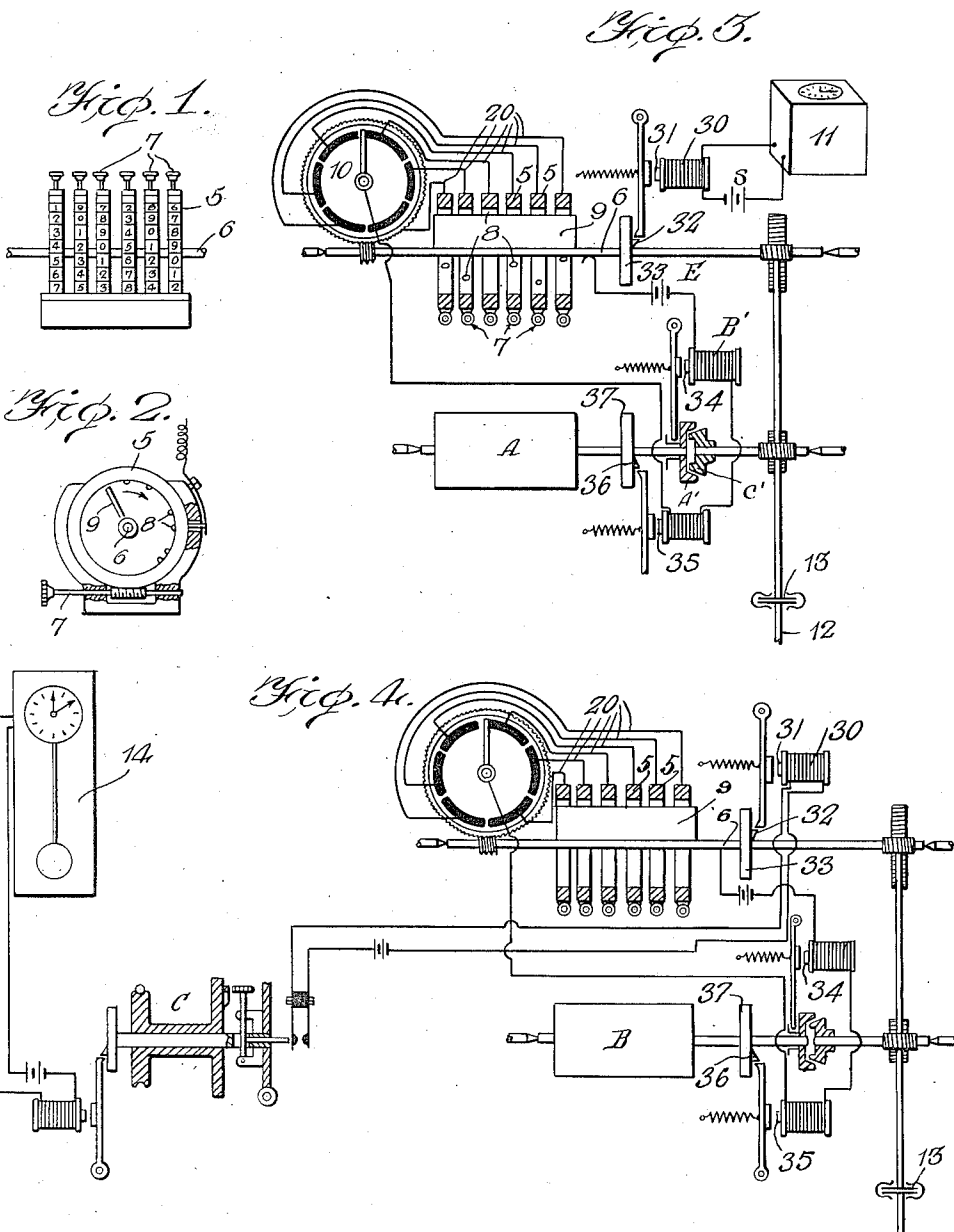
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SECRET MESSAGE TRANSMITTING SYSTEM

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UNITED STATES PATENT OFFICE.

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SECRET-MESSAGE-TRANSMITTING SYSTEM.

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This invention relates to simple means for ensuring with certainty, secret transmission of telegrams, tracings of drawings or pictures in half tones, whether these transmissions are made by wire, (simple metal conductor with earth or closed circuit), or whether they are made by wireless through the ordinary means of radio telegraph.

In the drawings accompanying this application,

Fig. 1 is a front elevation of a translator, or elements having numerical combinations controlling release of the drums of the transmitter and receiver.

Fig. 2 is a side elevation of Fig. 1.

Fig. 3 is a diagrammatic view representing the elements of the transmitting station, and

Fig. 4 is a similar view representing the elements of the receiving station.

The method employed in the invention is applicable in a general way to any apparatus employing corresponding movable members, one at the transmitter and the other at the receiver, on which are placed respectively the document to be transmitted and the sheet which is to receive the transmission.

The preferred form will be described in explaining the drawings but it will be understood that any other movable element may be utilized in place of the cylinders shown in the drawing, depending on conditions and convenience.

In the form represented in the drawings, the apparatus has for its object to render secret the transmissions by or without wire, which utilize at the outset a sheet rolled upon a cylinder A and explored by a point which is displaced by the reliefs of the sheet and which causes variations in the intensity or the duration of the local current. The local current, varied in intensity or in duration, acts upon an optical system which promotes the photographic impression on a sensitive sheet rolled upon a cylinder B

analogous to that of the transmitting station. This system is described more fully in my Patent No. 915,154.

It is necessary that the two cylinders A and B turn exactly in the same lapse of time, and it is also necessary that they part from their starting point at the same moment, so that the two documents may correspond. It is also necessary to the proper functioning of the apparatus that there be no recognizable impulsion. In order to materialize the conditions one may govern the two cylinders by regulated clocks and bring the beats or oscillations of the pendulum to coincidence by a special signal. This was made the object of my Patent No. 1,260,303. In a system thus combined, with a view to assuring the secrecy of the transmissions, it is provided that the cylinders B and A regulated by the beats of the isochronous pendulums start at instants variable in the duration of the regulation beat.

It must therefore be well understood that between two regulation beats, there elapses a unit of time. Each turn of the cylinders is made at a speed greater than these beats and begins at instants varied on this unit of time.

If, for instance, one considers the unit of time to be equal to 1; if the arrangement is such, that the rotation of the cylinders is effected in $\frac{1}{6}$, one will have the liberty of disposing of an interval of rest of $\frac{5}{6}$ for these regulations of starting.

Therefore, one can, for example, make the cylinder start during 6 consecutive turns or 80 revolutions at the following moments:

1. Turn: at the end of the 2nd fraction.
2. Turn: at the end of the 1st fraction.
3. Turn: at the end of the 5th fraction.
4. Turn: at the end of the 4th fraction.
5. Turn: at the end of the 3rd fraction.
6. Turn: at the beginning of the unit of time.

Thus there will have elapsed in the first beat:

	$\frac{2}{6}$ seconds at rest	$\frac{1}{6}$ for the turn	$\frac{3}{6}$ of rest
in the 2d beat	$\frac{1}{6}$	"	"
in the 3d "	$\frac{5}{6}$	"	"
in the 4th "	$\frac{4}{6}$	"	"
in the 5th "	$\frac{3}{6}$	"	"
in the 6th "	$\frac{0}{6}$	"	"

Whoever is not in possession of this rule, like that which is actually receiving and regulated by the same beat, this secret, can in no case intercept a transmission, even if he had a listening apparatus In order to obtain these varied startings,

there has been devised the arrangement represented in Fig. 3 and Fig. 4.

The driving shaft 12 drives the shaft 6 whose rotations are regulated by the beats of the pendulum 11 by means of an electric system of any kind; the shaft 6 will therefore turn in the unit of time.

On the shaft 6 there is a blade 9 (contact piece) which turns in the interior of the six rings 5 and touches each one of them with a stud 8. During this time the shaft 6 actuates a distributor 10 which turns one sixth as fast as the shaft 6. This distributor puts at each turn of shaft 6 one of its studs and one of the rings 5 into a local circuit.

The member formed by the rings 5 and shown particularly in Figs. 1 and 2 comprises the rings 5 which are equally spaced and in parallel relation to each other and have the common shaft 6 passing through them. Each ring may be individually moved in relation to the shaft 6 by the micrometer tangential screw 7. The rings have on their inner surfaces the conducting studs or pins 8 and each of the rings is connected by the leads 20 with the segments of the distributor 10. The contacting blade is fixed to the shaft 6 and at each revolution of the shaft 6 the blade 9 contacts in turn with the studs 8, closing the circuits. As soon as the blade 9 touches the stud 8 of the ring 5 put into circuit by the distributor 10, the current started promotes the release of the cylinder A which turns six times faster than the shaft 6, and one can realize the combinations of which an example is given above. In the case developed one would have obtained the combination of the secret by putting in line the ciphers of the rings 215-430, which constitutes the key to the system. The numbers 215-430 are simply a key and represent but one of the 1,000,000 combinations possible by choosing 6 numbers at a time from a possible 10^6 . At the receiving end (Fig. 4) the system interposed between the pendulum 14 and the shaft of the blade permits of the synchronization of the rotation of this shaft with the shaft 6 of the transmitter (Fig. 3). For this, the pendulum 14 regulates the rotation of the plate C, and on the latter a displaceable contact starts the current of release at the exact instant in which the clock 11 releases the shaft 6 (one obtains this synchronism by means of observations with a telephone receiving circuit or otherwise). The rings of the receptor being in the same position as that of the transmitter, the cylinder B will be started at the same instant as the cylinder A, and turning with the same speed, there will be an exact coincidence in the time of the rotations of these two cylinders. It will suffice if the receptor arranges the ciphers of the rings 5 in order to form the instantaneous key 215-430. When the transmitter and the receiver are

placed on the same key, the document sent clear from the movable member of the transmitter is received clear by the receiver; otherwise it is totally indecipherable. The number of rings may obviously be varied and it is possible to have many combinations, regulated one by the other. The time not utilized for true transmission may be employed for "parasite" emissions, and the message will be meaningless for any receiver which is not provided with the key.

The operation of the device is as follows: The clock or chronometer 11 at the transmitting station periodically closes the circuit of the battery S. This allows the current to flow through the electromagnet 30 and attract the armature 31 which on being displaced releases the stop 32 on the disc 33 which is attached to the shaft 6 allowing the shaft to make a revolution. As the contact 9 closes the circuits between the rings 5 and the segments of the distributor 10 the electromagnets B^1 and B^2 are energized. The armature 34 being attracted by its magnet B^1 operates the clutch composed of the members A^1 and C^1 . The armature 35 being simultaneously attracted by its magnet B^2 releases a stop 36 on a disc 37 which is secured to the shaft of the cylinder A. The cylinder A is then free to rotate and suitable mechanism such as is disclosed in my co-pending application filed March 3, 1922, Serial No. 540,905, is employed for transmitting to the receiving station whatever may be placed on the cylinder A.

The receiving station with the exception of the impulse receiving device C which has been described is similar to the transmitting station and the parts bear like reference characters. A sensitized surface applied to the cylinder B receives what is being transmitted from the transmitting station.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The method of secret transmission by signals which comprises means for synchronizing the operating time period of the transmitting and receiving means, and means adapted to regulate the simultaneous operation of the said transmitting and receiving apparatus, the said simultaneous operation commencing at variable instants.

2. The method of secret transmission by signals which comprises means for synchronizing the operating time period of the transmitting and receiving means, and means adapted to regulate the simultaneous operation of the said transmitting and receiving apparatus, the said simultaneous operation commencing at variable instants, in the time units of the beats of the synchronizing means.

3. Means for secret transmission comprising

ing a transmitter and a receiver, means adapted to synchronize the time periods of the operations of the transmitter and receiver, and means adapted to start simultaneously the operations of the said transmitting and receiving apparatus at variable instants in the time units of the beats of the said synchronizing means.

4. Means for secret transmission comprising ing movable members located at the transmitting and receiving stations, pendulums located at the said stations adapted to synchronize the said movable members, and local electric breaks adapted to actuate the said movable members between two beats of the pendulums at the same instant at both stations.

5. In an apparatus for transmitting secret messages comprising a transmitter having in each cycle of its movement idle and transmitting periods, and means for determining at will the relative extent of the idle to the transmitting periods of each cycle.

6. In an apparatus for transmitting secret messages comprising a transmitter having in each cycle of its movement idle and transmitting periods, and means for determining at will the relative extent of the idle to the transmitting periods of each cycle, and a receiver responsive only to the signals transmitted during the transmitting periods.

7. In an apparatus for transmitting secret messages by signals, means adapted to regulate the simultaneous operation of a transmitter and a receiver, comprising regulating shafts, the said regulating shafts supporting movable contacts and encircling these movable contacts suitable rings, each of said

rings being displaceable at will in relation to said shafts.

8. In an apparatus for transmitting secret messages by signals, means adapted to regulate the simultaneous operation of a transmitter and a receiver, comprising regulating shafts, the said regulating shafts supporting movable contacts and encircling these movable contacts suitable rings, each of said rings being displaceable at will in relation to said shafts by means of a tangential screw.

9. In an apparatus for transmitting secret messages by signals, means adapted to regulate the simultaneous operation of a transmitter and a receiver, comprising regulating shafts, the said regulating shafts supporting movable contacts and encircling these movable contacts suitable rings, each of said rings being displaceable at will in relation to said shafts, each of these rings being connected with a collector.

10. In an apparatus for transmitting secret messages by signals, means adapted to regulate the simultaneous operation of a transmitter and a receiver, comprising regulating shafts, the said regulating shafts supporting movable contacts and encircling these movable contacts suitable rings, each of said rings being displaceable at will in relation to said shafts, each of these rings being connected with a collector; each of said rings having a conducting stud and adapted to contact with the movable contact.

In testimony whereof I affix my signature.

EDOUARD BELIN.