May 6, 1941. C. R. DOTY 2,240,553

TIME RECORDING SYSTEM

Filed June 8, 1938 2 Sheets-Sheet 1

FIG.1.

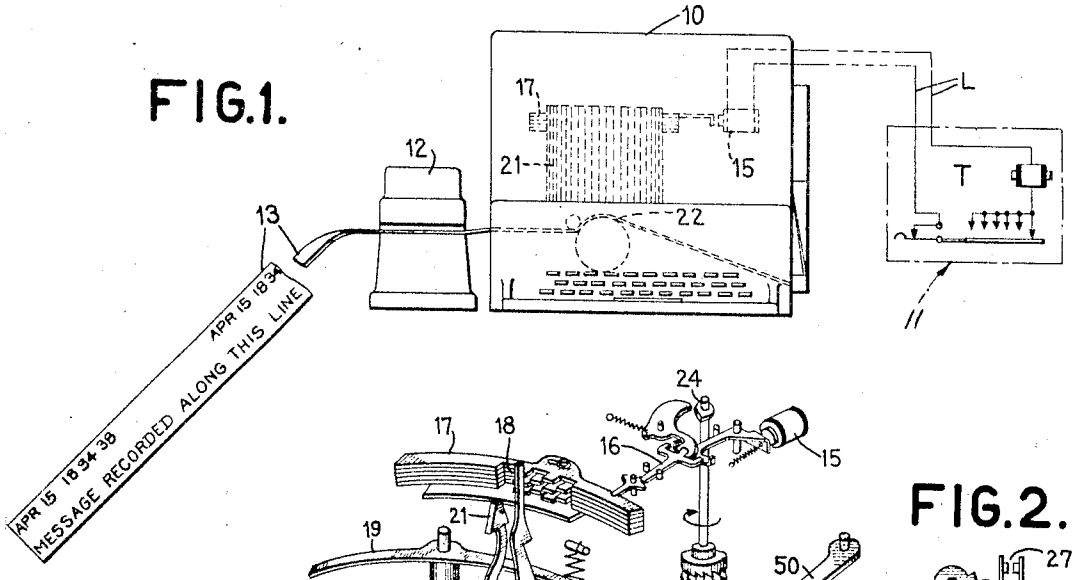


FIG.2.

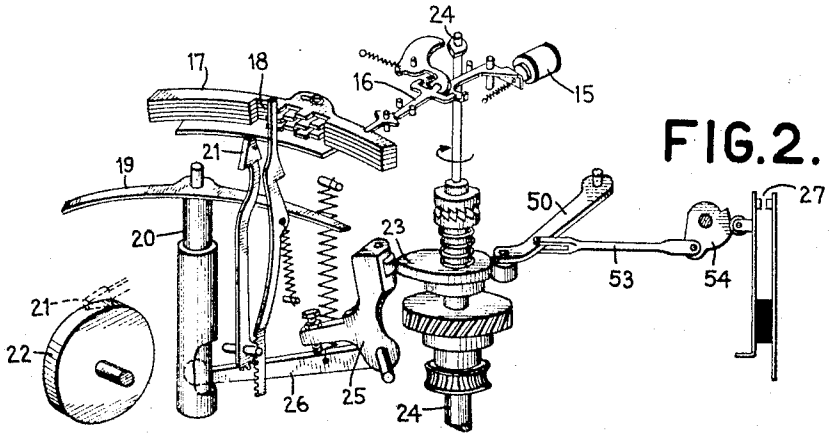
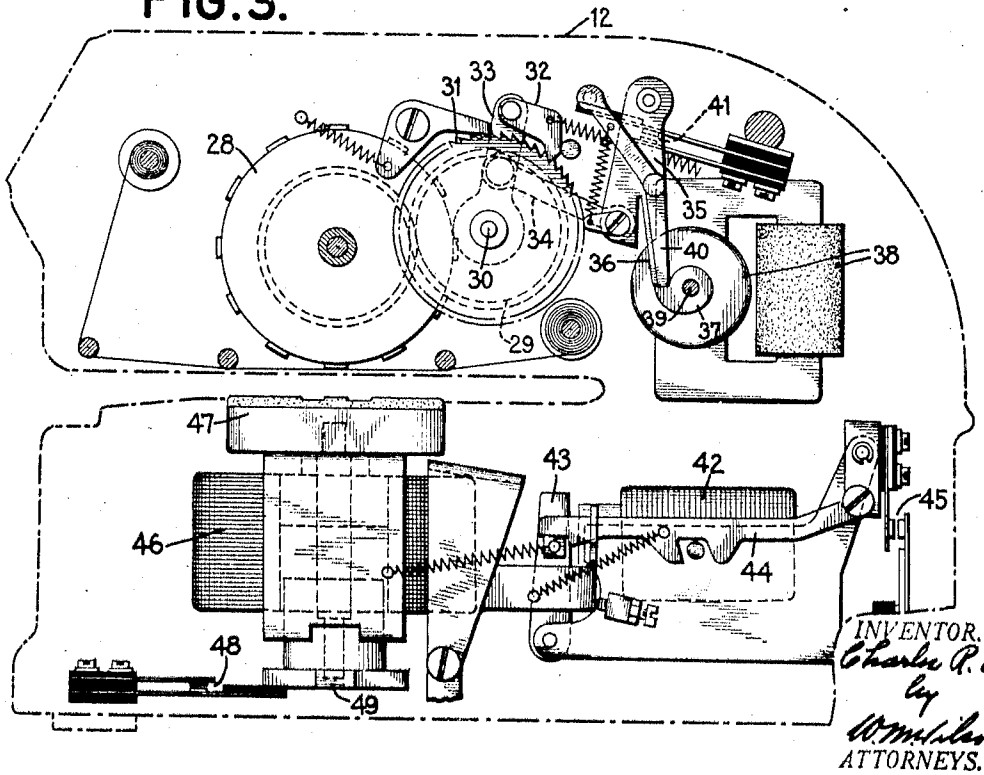


FIG.3.



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May 6, 1941. C. R. DOTY 2,240,553

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Filed June 8, 1938 2 Sheets-Sheet 2

FIG.4.

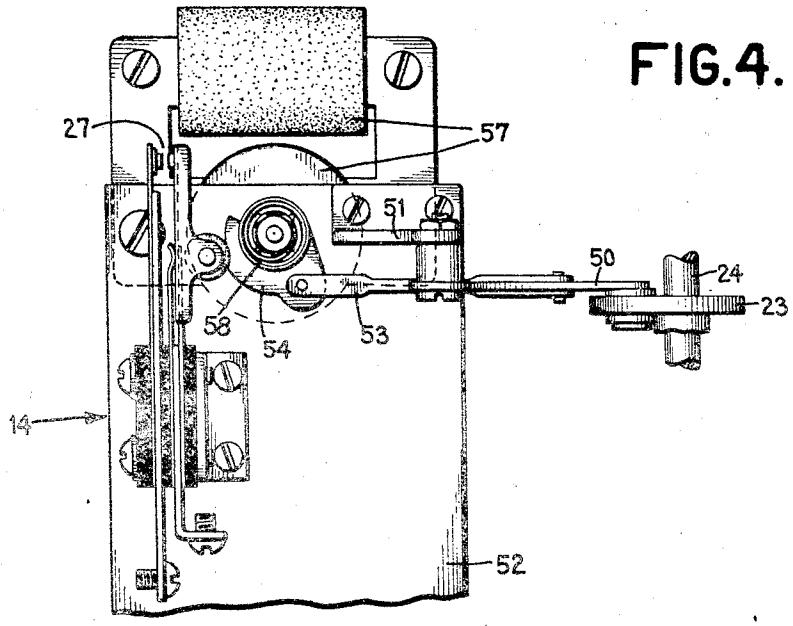


FIG.4A.

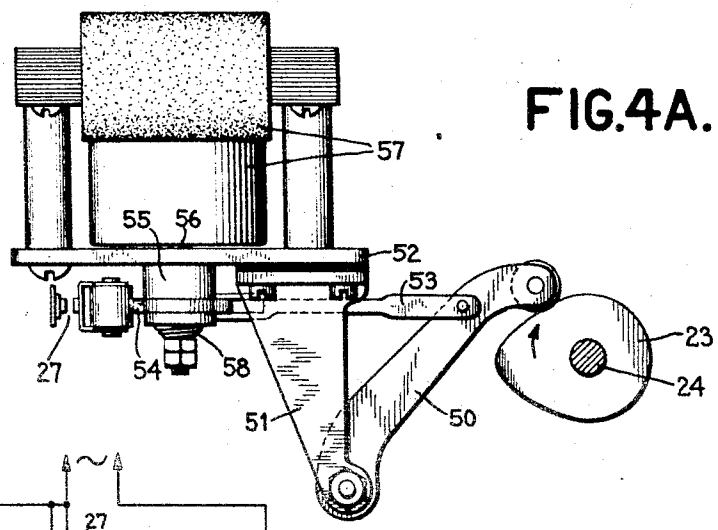
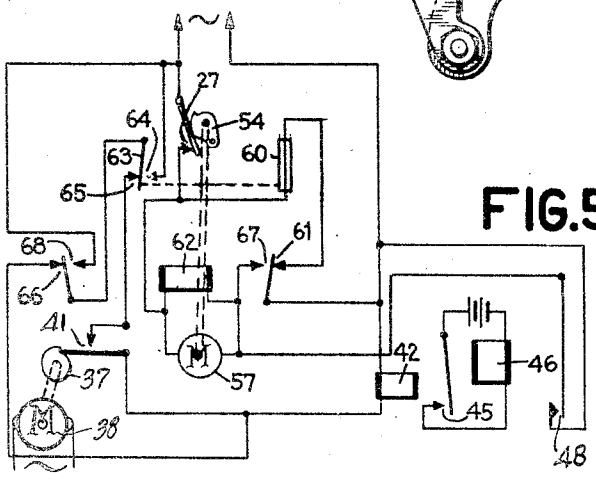


FIG.5.



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TIME RECORDING SYSTEM

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Application June 8, 1938, Serial No. 212,527

5 Claims. (Cl. 234—27.5)

This invention relates to improvements in automatic time imprinting systems and more particularly to time recording systems applicable to signaling systems, such as printing telegraph systems.

In the co-pending application Serial No. 212,526 filed June 8, 1938, an automatic time imprinting system, of the type referred to, is shown and described, and briefly comprises a time recording device adapted to register the true time upon a message tape whenever the associated message recorder is rendered operative, and in addition thereto, is adapted to effect time registrations automatically at periodic intervals, independently of the message recorder, as long as the said recorder remains operative; and upon completion of recording the message, that is upon completion of the operation of the recorder, the automatic time registration is adapted to be suppressed a predetermined timed interval after the last operation of the recorder.

In the present invention, one of the objects resides in the provision of time delay means, such as suitable thermal control means, to delay the initial time registration upon operation of the signaling device. By the provision of the said thermal control means initial time registration can be suppressed for a suitable predetermined time so as to prevent superimposition of the said initial registration on the preceding final registration effected on the message tape, in the event other suitable tape advancing means after the last character recording are not provided. Due to the said time lag the message tape can be advanced sufficiently to avoid double time registrations.

Another object of the present invention resides in the provision of means positioned mechanically rather than electrically to control the suppression of the automatic time registration. In the said copending application the signaling device, when operated, is adapted to operate associated contacts to complete a circuit to a control solenoid adapted to position a time delay control cam element. In the present invention the signal recorder is adapted to position mechanically a time delay control cam element.

Another object is the provision of means to prevent the periodic time registration from being recorded on the initial or starting time registration, in the event both occur within a timed period, for example, equivalent to the time lag required for the operation of the thermal unit, thus permitting the tape to be advanced sufficiently to avoid superimposition of the said time registrations.

Further objects of the instant invention reside in any novel feature of construction or operation or novel combination of parts present in the embodiment of the invention described and shown in the accompanying drawings whether within or without the scope of the appended claims and irrespective of other specific statements as to the scope of the invention contained herein.

In the drawings:

Fig. 1 is a diagrammatic showing of the relationship of the signaling device and the time imprinting unit to effect the recording of both on the same face of the message blank.

Fig. 2 is a detail view of the teletypewriter showing the relationship of the control elements thereof.

Fig. 3 is a side elevation view showing the main operating elements of the time imprinting unit.

Fig. 4 is a side elevation view showing the control elements of the time delay unit.

Fig. 4—A is a plan view of the time delay unit.

Fig. 5 is a circuit diagram of the system.

General Description

The time and message recording system is shown to comprise a signaling device such as the teletypewriter **10** in Fig. 1, which is adapted to be controlled by a similar device **11** at a remote station. Associated with the teletypewriter unit is shown a time imprinting unit **12**, such as a time stamp, disposed adjacent to the teletypewriter so that the message tape **13** is fed directly from the message recorder to the time recorder unit. The said tape is adapted to be aligned in the time imprinting unit so that the time registration is not only recorded on the same side of the tape as the message but also adapted to be recorded above the message. The time imprinting system is adapted to be rendered operative a predetermined timed interval after the initial operation of the teletypewriter unit. A thermal control unit is provided to introduce the desired time lag to suppress the initial time registration. It will be obvious from the description to be set forth herein that the signaling device which is shown as the teletypewriter unit may be either a transmitting or receiving unit. In the present illustration the time printing unit is shown associated with a receiving teletypewriter unit **10**. The said teletypewriter unit is controlled by a similar unit **11** at a remote station and is adapted to be rendered operative upon the receipt of the character signals impressed upon the transmission medium designated L.

Upon operation of the message recording unit a time delay mechanism generally indicated at **14** (Fig. 4) is set in operation to operate the time imprinting unit **12** to register upon the tape **13** the true time of receipt of the first signal. As long as the teletypewriter unit is operated, the time stamp is operated at periodic intervals to register the time upon the message tape. The

mechanism to effect this automatic operation is independent of the message recording unit and controlled solely by the time imprinting unit. When the teletypewriter is rendered inoperative, the time delay mechanism, after a predetermined time interval, is effective to render inoperative the time imprinting unit. Similarly, during the time period that the teletypewriter is operated, the said mechanism is adapted to be in operation but is restrained from being effective and from rendering the time system inoperative until the teletypewriter no longer is functioning.

The different control units just mentioned will now be described in detail.

Signal recording device

The signaling device is shown to comprise a message recording mechannism such as the well-known teletypewriter disclosed and described in detail in the United States Patent 1,745,633, issued February 4, 1930, so that it is deemed necessary only to set forth the following brief description of the operation thereof. It is well known that upon receipt of the character or code signals by the control magnet unit 15 that character type bar selection is effected by selectively positioning the selector mechannism generally designated 16 which in turn is effective to position selectively the permutation or code bars 17 in accordance with the signals received and impressed upon the said control magnet unit. Upon positioning of the code bars, a particular actuating bar 18 is selected and then operated by the printing bail 19 supported by the plunger 20 to operate the selected type bar 21 to engage the printing platen 22 to record the selected character.

It is well known that immediately upon selection or positioning of the code bars 17 that the cam element 23 is set in motion to be rotated by the continuously rotating shaft 24 operating the cam follower member 25 and lever 26 associated with the printing bail plunger 20. The cam element 23 is adapted to make one revolution and is then brought to rest at a normal position for each printing operation. Therefore, it is seen that the printing bail 19 and cam element 23 are operated each time a code combination of signal impulses is impressed upon the control magnet.

The contacts 27 are provided in the teletypewriter unit and are suitably disposed so as to be operated upon operation of the unit by means of the cam follower arm 50 and cam element 23. The said contacts 27 form part of the mechanically controlled time delay unit and will be described in detail presently.

Time imprinting unit

The time registration or recording unit is shown to comprise a well known type of time stamp and is similar to the time stamp fully disclosed and described in the United States Patent 1,798,583, dated March 31, 1931. Therefore, it is believed that the following brief description thereof will suffice.

The time stamp generally is shown to comprise the usual type elements 28 of which any number may be provided to register the hours, minutes and seconds, if so desired, and are adapted to be positioned by the driving gear 29 which is secured to shaft 30. The type wheels are provided with the usual transfer mechanism and thus are adapted to indicate any of the desired increments of time. Secured to the shaft 30 is a ratchet wheel 31 which is adapted to be positioned periodically by the pawl 32 pivotally supported by the lever 33 which is rotatably mounted on shaft 30. Attached to the lever 33 is an arm 34 which joins with a part of the bell crank member 35 pivotally supported by the unit which also has an extension arm 36 adapted to be positioned by the cam 37. It should be mentioned here that the cam 37 is not provided in the Patent 1,798,583. In this said patent the standard impulse magnet is provided to actuate the pawl mechanism, whereas in the present time stamp mechanism a synchronous motor generally indicated at 38 is provided to rotate the shaft 39 upon which the cam 37 is secured. The synchronous motor is adapted to rotate the shaft 39 one complete revolution each minute. Of course, it is obvious that the mechanism can be arranged for any desired interval of time. The said cam 37 is not only adapted to position the bell crank lever 35 every minute so as to actuate the ratchet 31 and shaft 30 thus positioning the type wheels accordingly but is also adapted to position the lever 40 pivotally secured to the lever 35 to actuate the contacts 41 every minute or periodically in accordance with the chosen time interval. The purpose of the said contacts will be understood as the description progresses.

The time stamp is provided with the usual control relay 42 which upon energisation is adapted to attract the armature 43 and actuate the lever 44 to operate the control contacts 45. The contacts 45 as shown in Fig. 5 are connected directly to the time stamp solenoid 46 to effect energization of the said solenoid each time the contacts 45 are closed. Energization of the solenoid causes the printing platen 47 to be raised to engage the type wheels 28 and thus to effect time registration upon the tape 13 indicating the true time when the said time stamp is rendered operative. Contacts 48 are provided and are suitably disposed so as to be operated by the armature 49 of the solenoid each time the solenoid is energized. The purpose of these contacts will be explained in connection with the description of the circuit diagram.

Time delay mechanism

Referring now to Figs. 4 and 4—A, it is shown that the timing control unit comprises a cam follower arm 50 pivotally supported on the bracket 51 which is suitably secured to any suitable plate or member 52. By means of the link 53 which is connected to the cam follower arm 50 and the frictionally mounted cam element 54, the element is adapted to be rotated in a clockwise direction upon movement of the cam follower arm to the left as viewed in Fig. 4—A. The cam element 54 is rotatably mounted on a sleeve 55 which is secured to the shaft 56 which is rotated in a counterclockwise direction at any desired or suitable rate by means of the synchronous motor generally indicated at 57. Associated with the cam element and adapted to be operated thereby are the contacts 27 which normally, as shown, are open. By means of the frictional mounting of the cam element 54, the element may be positioned in a clockwise direction by the cam follower arm 50 and upon operation of the synchronous motor can also be positioned in a counterclockwise direction. Suitable spring elements such as indicated at 58 are provided to urge the cam element 54 against the sleeve 55 so that, whenever the arm 50 is not actuated, the shaft 56 upon rotation is adapted to position the cam element. It is shown that the time control unit generally designated 14 is positioned in the tele-

typewriter unit so that the follower arm 50 is actuated by the cam element 23 of the teletypewriter unit. It was mentioned hereinabove that upon receipt of the character signals the shaft 24 and cam element 23 are adapted to be rotated completing one revolution for each character signal or signals.

Now assuming that the shaft 24 is rotated and also adapted to rotate the cam element 23 in the direction indicated by the arrow in Fig. 4—A, it is seen that the cam follower arm 50 is moved in a direction to the left as viewed in this figure to rotate the cam element 54 in a clockwise direction, thus closing the contacts 27. These elements just described, namely, the arm 50, link 53 and cam element 54, are adapted to remain in the set position to maintain the contacts 27 in a closed position. Now let it be assumed that the synchronous motor 57 is rendered operative to rotate shaft 56 and due to the frictional mounting of the cam element 54, the said element is now rotated in a counterclockwise direction to be reset to the normal rest position as shown in Fig. 4. Again let it be assumed that the rotation of the shaft 56 is such that a time interval of the order of ten seconds is required before the cam element 54 is restored to a position to permit the contacts 27 to be opened. Therefore, it is understood that at the end of the ten second period the cam element 54 and cam follower arm 50 are reset in the normal rest position. The positioning of these elements can be effected, as described, if the cam element 23 in the teletypewriter unit remains in the normal rest position as indicated in Fig. 4—A and is not rotated during the ten seconds interval. However, let it be assumed that the synchronous motor 57 is operated to rotate the shaft 56 and tending to rotate the associated cam element 54 in a counterclockwise direction and at the same time let it be assumed that the teletypewriter unit is operated to rotate the shaft 24 and cam element 23. It is then seen that the cam follower arm 50 is positioned to the left to rotate the cam element 54 in a clockwise direction overcoming the tendency of the synchronous motor to reposition or restore the cam element 54 to the normal rest position. In this manner it is seen that even though the synchronous motor 57 is operative, a ten second interval after the last operation of the cam element 23 is required to fully restore the cam element 54 to a position so as to permit the contacts 27 to be opened. The purpose of this arrangement will now be explained.

Operation of the system

Referring now to Fig. 5 and assuming that all the control elements just described are inoperative and that the message tape 13 is properly aligned in the time stamp mechanism 12 and that the teletypewriter unit 11 at the remote station is now set into operation to impress the character signals upon the transmission medium L to energize the teletypewriter control magnet unit 15 to effect proper selection of the code bars 17, thereby effecting the recording of the characters upon the tape 13. To effect recording of the characters by the teletypewriter unit cam element 23 of the teletypewriter unit is rotated one revolution for each character recording operation. Upon rotation of the said cam element, the cam follower arm 50 is adapted to be actuated to position the cam element 54 so as to close the associated contacts 27. Upon closure of the contacts 27, a circuit is completed from one terminal of the supply source through the said contacts through a thermal control unit generally designated 60 and the normally closed contacts 61 of relay 62 to the other terminal of the supply source, thus energizing the said thermal control unit. The thermal control unit may be of any suitable type well known in the art adapted to operate suitably disposed contacts upon energization thereof after a predetermined timed interval. Let it be assumed, for the sake of illustration, that the present thermal unit is adapted upon energization of a period, let us say, of the order of 3 to 5 seconds, to position the control armature 63, so as to engage the contact 64 and be disengaged from the contact 65. Therefore, it is seen upon energization of the thermal control unit that a circuit after a period of 3 to 5 seconds is completed as follows: From one terminal of the supply source through the contact 64, armature 63, normally closed contacts 66 of the relay 62, coil of the time stamp control magnet 42 to the other terminal of the supply source, thus energizing the magnet 42. Energization of the said magnet causes the associated contacts 45 to be closed to close the battery circuit to the time stamp solenoid 46, thus energizing the said solenoid to render the time stamp mechanism operative. Thus, it is seen that at a predetermined timed interval after rendering operative the signaling device, such as the teletypewriter unit, the time imprinting unit is rendered operative to effect the true time registration upon the message tape 13. Upon energisation of the solenoid 46 to effect time registration upon the message tape, contacts 48 are closed at this time. Closure of the contacts 48 causes the following circuit to be established, namely, from one terminal of the supply source through the contacts 27 now closed, through the coil of relay 62 and also through the synchronous motor 57 to the contacts 48 now closed to the other terminal of the supply source, energizing both the relay 62 and the synchronous motor 57. Upon energization of relay 62, a holding circuit therefor is established by means of the contacts 67 and is maintained as long as the contacts 27 remain closed. Energization of the synchronous motor 57 is now effective to rotate shaft 56 and the associated cam element 54 in a counterclockwise direction to tend to reposition or reset the cam element to the normal rest position indicated in Fig. 4 to reopen the contacts 27. However, the timed interval required for this operation, it will be remembered, is of the order of ten seconds.

Therefore, it is understood that in the event the teletypewriter unit is maintained operated by impressing a number of character signals upon the control magnet unit thereof continuously that the cam element 54 during the recording of each character by the teletypewriter unit is rotated in a clockwise direction each time, thus overcoming the effect of the synchronous motor to restore or reposition the cam element 54 to the normal rest position and in this way the contacts 27 are maintained closed as long as the character signals are received, provided the character signals are received during the predetermined timed interval, namely, ten seconds. Upon energization of the relay 62 the contacts 61 are opened, thus disconnecting the thermal control unit 60 from the supply source and thereby permitting the associated control armature 63 to re-engage the contact 65 and become disengaged from the contact 64. Also, upon energization of the relay

62, contacts 68 are closed so that upon operation of the contacts 41 a circuit is completed from one terminal of the supply source through the contact 68 through the contact 65 and contacts 41, coil of magnet 42 to the other terminal of the supply source to energize the magnet 42. Energization of the magnet 42 effects closure of the associated contacts 45 to cause the time stamp solenoid 46 to be energized thus effecting time registration. It was mentioned hereinabove that the contacts 41 are adapted to be operated by the cam 37 in the time stamp unit. The contacts 41 for the sake of illustration are assumed to be closed each minute, thus it is seen that as long as the contacts 27 are closed that the time stamp solenoid 46 is energized each minute, thus effecting the time registration each minute upon the message tape. Therefore, it is now understood that as long as the teletypewriter unit is rendered operative and the receipt of the successive character signals impressed upon the control magnet 15 are received at no less than at ten second intervals, the time registration is effected each minute upon the message tape. However, if there is a lapse of more than a predetermined interval of time, namely, the ten seconds between the receipt of the character signals, the synchronous motor 57 is effective to reposition the cam element 54 to the normal rest position as indicated in Fig. 4 to permit the contacts 27 to be opened, thus causing the relay 62 to be deenergized thereby restoring the system to a normally inoperative condition such as indicated in Fig. 5.

It has now been shown that upon operation of the message recorder the initial true time registration is not effected immediately upon the message tape but that such registration is effected after a certain time delay and thereafter that periodic time registration is effected as long as the message recorder is rendered operative to record the characters in accordance with the signals received and that the timing control unit is effective at a predetermined time interval after the message recorder is rendered inoperative to recondition the time imprinting system so as to be ineffective to continue further automatic time registrations at periodic intervals.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a system of the class described wherein a signaling device and operating means therefor are provided; the combination of a switch and closing means for said switch operated by the device upon each signal operation, a control circuit established upon initial closure of the switch, time recording means operated under the control of the control circuit, a periodic time impulse circuit, and means operated by the time recording means for transferring the control of the time recording means from the initial control circuit to the periodic time impulse circuit.

2. In a system of the class described wherein a signaling device and operating means therefor are provided; the combination of a switch and closing means for said switch operated by the device upon each signal operation, a start circuit established immediately upon initial closure of said switch, time delay means included in said start circuit and energized upon establishment thereof, a control circuit including means controlled by the energized time delay means for completing said control circuit at a predetermined brief interval of time after the establishment of the start circuit, time recording means operated by the control circuit to effect an initial time recording, a periodic time impulse circuit, and means controlled by the time recording means as an incident to the initial operation thereof for effecting a transfer of the control of the time recording means from the control circuit to the periodic time impulse circuit to effect repeated operations of the recording means at periodic intervals.

3. In a system of the class described wherein a signaling device and operating means therefor are provided; the combination of a switch and closing means for said switch operated by the device upon each signal operation, an auxiliary start circuit including time delay means energized upon initial closure of said switch, a control circuit for the recording means including normally open contacts arranged to be closed by the time delay means at a predtermined brief interval of time after the initial closure of the switch to energize said control circuit for causing operation of the recording means to effect an initial time recording, means controlled by the recording means for breaking both the control circuit and the start circuit upon initial operation of said recording means, and a periodic time impulse circuit conditioned by the control and start circuit breaking means for sending impulses at periodic intervals to effect repeated operations of the recording means.

4. In a system of the class described wherein a signaling device and operating means for said device are provided; the combination of a switch and closing means for said switch operated by the device upon each signal operation, a control circuit and a periodic time impulse circuit including sets of transfer contacts common to both circuits, means controlled by the switch upon initial closure thereof for operating one set of said contacts to complete the control circuit, time recording means operated by the control circuit upon completion thereof to effect an initial time recording, and means operated by the time recording means upon its initial operation for operating another set of said contacts and restoring the first operated set of contacts to effect simultaneously a break in the control circuit and a conditioning of the impulse circuit for operation of the recording means at periodic intervals.

5. The system defined in claim 4, in which the closure of the first operated set of contacts is delayed for a predetermined brief time interval after the initial closure of the switch by a thermal delay element coacting with said contacts and controlled by the switch.

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