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TELEGRAPH KEYBOARD CONTROLLED APPARATUS

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2 Sheets-Sheet 1

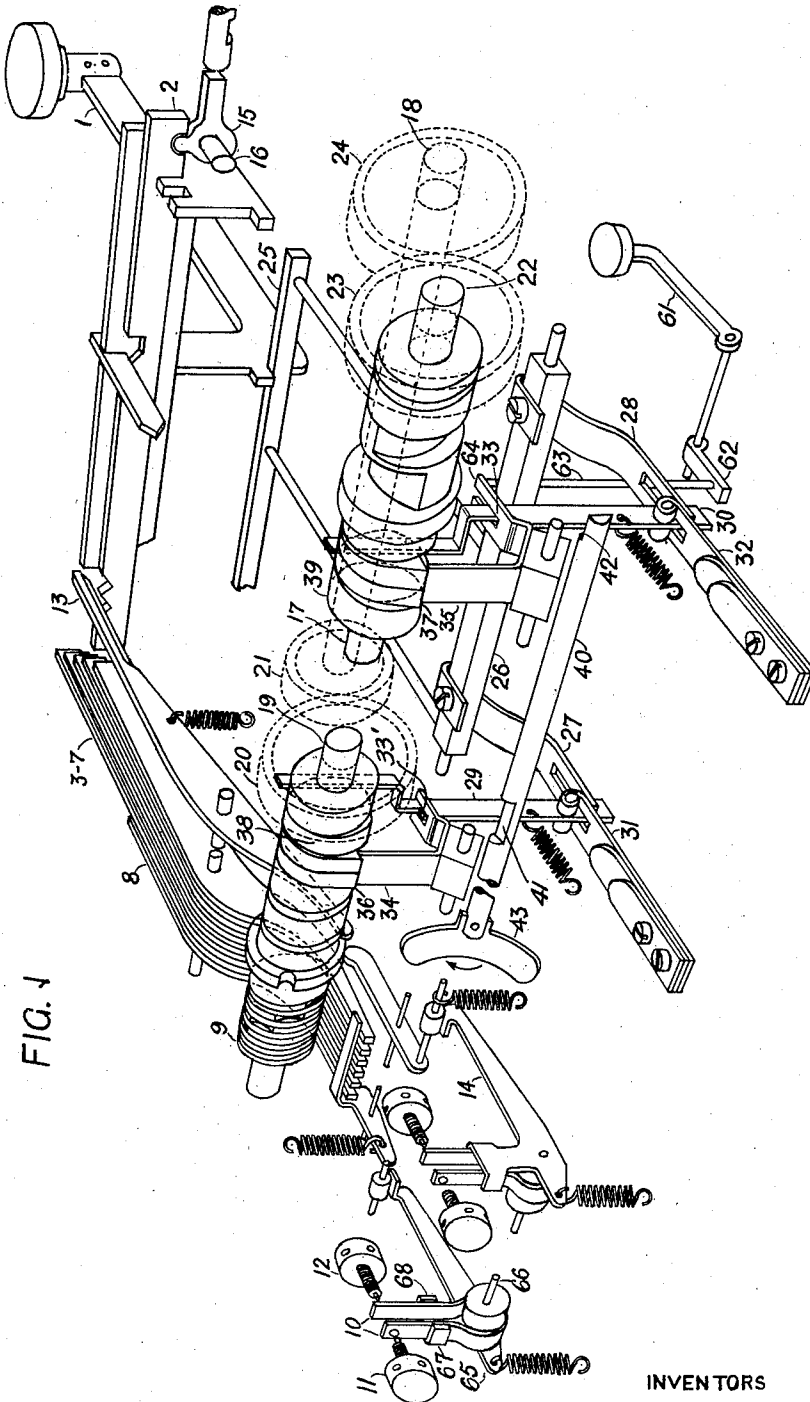


FIG. 1

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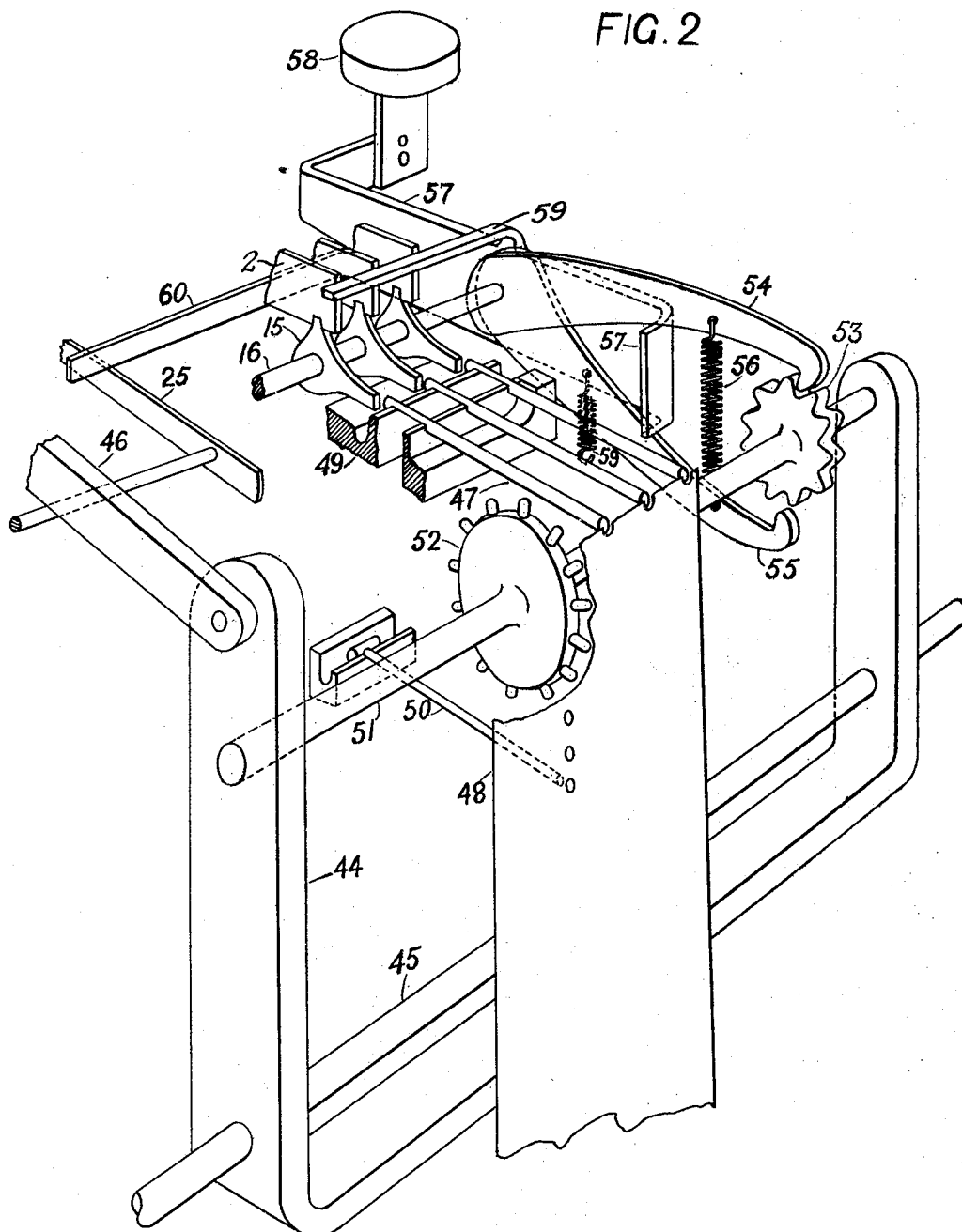
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FIG. 2



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TELEGRAPH KEYBOARD CONTROLLED APPARATUS

Application filed December 2, 1930, Serial No. 499,504, and in Great Britain October 23, 1930.

This invention relates to keyboard operated telegraph apparatus and refers more particularly to a combined keyboard controlled signal transmitter and tape perforator.

5 Under operating conditions and particularly in printing telegraph systems wherein signals are normally transmitted direct to line by the operation of a keyboard, it is desirable on occasions, during busy line periods
10 for instance, to be able to store signals for example in a perforated tape, for transmission by an automatic transmitter. In such cases an economy of apparatus is effected by combining a keyboard controlled transmitter
15 with a keyboard controlled perforator so that either function, or if desired both functions may be effected from a common keyboard.

Combined apparatus of this type is already known in which depression of a key lever in
20 a keyboard is arranged to actuate selectively a series of combination bars which determine the elements of the corresponding signal, a cam sleeve released on depression of any key effects the transmission direct to line of the
25 signal, or alternatively the perforation of a tape in accordance with these elements.

In this case the speed of rotation of the cam sleeve is primarily determined by the required speed of transmission of the group of
30 impulses representing each signal when sending direct to line. A disadvantage arises from this in that the speed of perforating these signals on a tape is not required to be limited by any such consideration. The speed of
35 operation of a keyboard controlled tape perforator can be higher, and with separate apparatus generally is in excess of the maximum speed at which a keyboard controlled transmitter can be operated, having regard in the
40 latter case to the limitation of speed usually imposed on the transmission of each group of elements representing a signal.

According to the present invention, signal
45 transmitting and tape perforating means are each independently operable under control of a common keyboard by common driving means. By this means, the convenience and economy of combined apparatus is retained
50 in a large measure, but each unit can now be

arranged to be operable at any desired speed independently of the other.

In one embodiment of the invention herein described the essential elements comprise a
55 keyboard, signal transmitting controlling means actuated from said keyboard, tape perforating controlling means also actuated from said keyboard, motor driving means, a lay shaft driven therefrom, signal transmitting actuating means driven from said lay
60 shaft through individual gearing means at one speed, and tape perforating actuating means also driven from said lay shaft through individual gearing means but at a speed higher than said signal transmitting actuating
65 means.

A subordinate feature of the present invention comprises means, in the tape perforating apparatus, for back spacing the tape for
70 effecting what are known as invisible corrections. As will hereinafter appear from the description, this is effected by the operation of a key lever which also ensures, if desired, that no perforating of the tape occurs on back
75 spacing, and releases mechanical means which effects the actual feed operations, in this case in a backward direction.

A further feature comprises the provision in the tape perforating apparatus of a particular key which on depression, rapidly runs
80 out blank tape as long as the key is maintained depressed. This obviates the repeated operation of the space key when it is desired that sufficient tape should be provided at the end of a series of signals, for example,
85 to permit the last signal perforated to pass through an automatic transmitter.

The invention will be more fully comprehended from the following description in
90 conjunction with the accompanying drawings in which Figure 1 shows a perspective view of the arrangement of the essential portions of a combined keyboard transmitter and tape perforator according to the present
95 invention, while Figure 2 shows a portion of the tape perforating mechanism.

Referring to Fig. 1 a series of key levers 1 of which one only is shown, is arranged to actuate selectively in longitudinal directions a series of five notched combination bars as
100

represented by the single bar 2. Opposite extremities of these combination bars cooperate with corresponding series of selecting members for signal transmitting means and tape perforating means respectively. Fingers 3 to 7 and 8 when released in cyclic order on rotation of cam sleeve 9 actuate contact means 10 between opposite contact screws 11 and 12. Each of the five fingers 3 to 7 cooperates with a corresponding combination bar to be intercepted or not in accordance with the longitudinal position of the latter, while a locking bar 13 and send-receive switch means 14 operate from cam sleeve 9, all in a manner already well-known and therefore only thus briefly referred to here.

The combination bars, as represented by bar 2, at the extremities opposite to fingers 3 to 7 control a corresponding series of independent members of which one only, 15 pivoted at 16, is shown in Fig. 1. These members form interposable hammer abutments for a corresponding series of punches in a movable die block for tape perforating mechanism which is shown diagrammatically in greater detail in Fig. 2 and will be further described later in the specification.

It has hitherto been usual in combined transmitting and tape perforating apparatus of this class to effect punching and feeding operations for the tape perforating mechanism from suitable cams on the signal transmitting cam sleeve, represented in Fig. 1 by sleeve 9, but in the present invention a separate cam sleeve 17 is provided to effect these operations. The two cam sleeves 9 and 17 are driven through individual gearing means from a common lay shaft 18 which is rotated at a constant speed by suitable motor driving means not shown. As shown in Fig. 1 the signal transmitting cam sleeve 9 is driven by a shaft 19 from the lay shaft 18 through gear wheels 20 and 21, while the tape perforating cam sleeve 17 is driven by a shaft 22 from the lay shaft 18 through gear wheels 23 and 24. Suitable ratios of gearing can thus be adopted between the lay shaft and the transmitting and perforating means respectively, whereby sleeve 17 when clutched to its driving shaft 22 is rotated at a higher speed than sleeve 9 when clutched to shaft 19 and thus permits the keyboard to be operated at a higher speed for perforating a tape than when direct signalling to line is being effected from the keyboard. In Fig. 1 gear wheels 23 and 24 are shown of equal diameter, while gear wheel 20 is larger than gear wheel 21 in a ratio of approximately 1.5 to 1. Sleeve 17 thus rotates faster than sleeve 9 in a ratio of approximately 3 to 2. Any desired speed of both signal transmitting and tape perforating means may be obtained, however, by varying the speed of the lay

shaft 18 and the ratios of the gear wheels to the cam sleeve driving shafts 19 and 22.

The control of the cam sleeves 9 and 17 from the keyboard in the arrangement shown in Fig. 1 is effected by a universal bar 25 which is depressed on operation of any key lever. This universal bar 25 swings on rock shaft 26 and causes arms 27 and 28, also fixed thereto, to raise corresponding members 29 and 30 which are shown suitably pivoted in leaf springs 31 and 32 respectively, which also serve as returning springs for rock shaft 26. A shoulder 33 and 33' formed on each of members 29 and 30 is adapted to engage one arm of a corresponding clutch releasing detent 34 and 35 respectively which when actuated releases clutch pawls 36 and 37 to clutch corresponding sleeves 9 and 17 to their respective driving shafts 19 and 22. Members 29 and 30 are each disengaged from their respective detents 34 and 35 by cams 38 and 39 respectively during the subsequent rotation of the cam sleeves, to re-arrest clutch pawls 36 and 37 after one revolution in known manner. The clutch pawls and driving ratchets may advantageously be of the type shown in U. S. Patent No. 1,682,889, having staggered teeth to ensure prompt engagement of the clutch.

In order that either the signal transmitting or the tape perforating means may be operated from the keyboard, a shaft 40 is provided with cam notch surfaces 41 and 42 which in the position of the shaft 40 as shown, holds member 29 out of engagement with detent 34 while member 30 is free to release its clutch for one revolution on each depression of a key lever 1. In this position of shaft 40 the tape perforating mechanism is operated from the keyboard and the signal transmitting mechanism is inoperative. By turning shaft 40, by thumb piece 43 for instance, through 90° in the direction of the arrow this situation is reversed, member 29 is free to engage its detent 34 and member 30 is held out of engagement with detent 35. In this position the signal transmitting mechanism is operated from the keyboard while the tape perforating mechanism is inoperative. If desired, shaft 40 may be provided with suitable cams to accord with each of three positions of the shaft instead of two, so that either transmitter or tape perforator, or both simultaneously, may be operated from the keyboard. The details of the tape perforating and feeding mechanism employed is shown more clearly in diagrammatic form in Fig. 2. In this figure the extremities of three only of the usual five combination bars 2 are shown, together with their corresponding members 15 independently pivoted on 16. A portion of the universal bar 25 of Fig. 1 is also shown in Fig. 2. The punch block and tape feed spindle for this form of construction is arranged on a mem-

ber 44 which is adapted to be oscillated on shaft 45, a link 46 operated by a cam on sleeve 17 being provided for this purpose. A series of punches 47 are slidably held in a guide plate together with a die plate in a punch block not shown which is fixed on member 44. When the combination bars 2 are selectively actuated on depression of a key lever, corresponding members 15 are either brought into line with their corresponding punches 47 or are rotated through an angle on pivot 16 out of line with the punches. Member 44 is then actuated through link 46 to bring the series of punches against members 15 thus having been brought into line therewith, causing the corresponding punches to perforate a paper tape 48. The punches are positively retracted from the tape on return of member 44 by a plate 49 fixed in a stationary part of the apparatus engaging the ends of suitable notches cut in the punches. A punch 50 abutting against a stationary part of the apparatus may be arranged to perforate a feed hole in the tape 48 at each step in which the tape is fed past the punches.

Rotatably mounted in member 44 is a feed spindle 51 having a spur wheel 52 engaging a row of centre holes perforated in the tape. A feed ratchet 53 having teeth or cam depressions equal in number to the teeth on spur wheel 52 is also fixed to spindle 51. Two feed detents 54 and 55 independently pivoted, conveniently as shown on fixed spindle 16, have extremities which can engage the teeth on opposite sides of a diameter of feed ratchet 53. A spring 56 tends to hold both extremities in engagement with feed ratchet 53, but a member 57 also conveniently pivoted on spindle 16 has a bent portion at an extremity on one side of spindle 16, which bent portion forms a distance piece between feed detents 54 and 55 and permits only one detent at a time to engage feed ratchet 53, the other detent meanwhile being maintained clear of the teeth on the other side of the ratchet. The extremity of member 57 on the other side of spindle 16 carries a finger piece conveniently arranged at the side of the keyboard, and forms a back spacing key. A spring 59 maintains this key in a normally raised position and consequently the upper detent 54 in engagement with feed ratchet 53. Two extensions 59 and 60 are also formed on member 57, extension 59 being vertically above spindle 16 and adapted on depression of finger piece 58 to move horizontally to the nonperforating position any combination bar 2 which had been previously operated to the position to cause its corresponding punch to perforate the tape. The other extension 60 is arranged on depression of the finger piece 58 to operate the universal bar 25 which releases the cam sleeve as previously described.

The operation of the perforating feeding

and back spacing mechanism is as follows: When shaft 40 is turned to the position to cause the operation of the tape perforator, on depression of any key lever in the keyboard, such as key 1, combination bars 2 are set to bring members 15 into line, or not into line, with their corresponding punches 47. Universal bar 25 is simultaneously operated to effect the release of cam sleeve 17 for one revolution. During this revolution link 46 is operated by a cam on sleeve 17 to swing member 44 on spindle 45. The guide and die plates of the punch block fixed to member 44 are thus moved and carry the tape against the series of punches to cause the tape to be perforated according to the setting of combination bars 2, a feed hole being punched in the tape by punch 50 at the same time. This movement of member 44 moves feed spindle 51 relatively to feed detents 54 and 55, detent 54 engaging the next tooth of feed ratchet 53. On the return movement of member 44 during the one revolution of cam sleeve 17 the punches are retracted from the tape by plate 49 and detent 54 causes ratchet 53 to rotate one tooth and feed the tape forward one step in preparation for the next signal combination.

If an incorrect key has been depressed and it is desired to back space the tape in order to erase the signal by superimposing thereon a full series of perforations which obliterate the identity of that particular combination perforated in the tape, as already known, the back spacing key 58 is depressed. This permits detent 55 to engage with feed ratchet 53 in place of detent 54, while extension 59 replaces any previously operated combination bars 2 so that no perforating will take place. Extension 60 operates the universal bar 25 which releases the cam sleeve 17 and effects the movement of member 44 as on depression of any other key. The movement of ratchet 53 relatively to detent 55 in this case, however, effects a movement of spindle 51 of one step in a backward direction. Depression of key 58 thus effects back spacing of the tape without perforating, these operations being performed by the cam sleeve and not by the actual effort required to depress the key 58.

In Fig. 1 a further feature whereby the speed of operation of the tape perforating apparatus may be improved is shown in the provision of a key which may be called a "run out" key. As usually installed, a certain minimum distance exists between the punch block of a perforating apparatus and a tape controlled transmitter with which it works in conjunction. It is therefore necessary on completing the perforating of any tape to "run out" blank tape to a minimum of that distance in order that the last signals perforated in the tape may pass through the transmitter. Other cases may arise in which

it is desired to provide a length of blank tape between or after signal perforations. In order to obviate the usual practice of depressing the spacing key successively a number

5 of times, a key lever 61 is provided which releases the tape perforating cam sleeve 17 for as long as the key is held depressed.

As shown in Fig. 1 on depression of key 61 arm 62 is raised to slide rod 63 and actuate detent 35 through extension 64 of detent 35, clear of the clutch pawl 37. It will have been noticed that when operating the tape perforating mechanism from the keyboard, detent 35 is disengaged from member 30 by 10 cam 39 on sleeve 17 during each revolution consequent upon each depression of a key. This, as previously described, ensures that only one revolution is effected. When detent 35 is maintained operated by key 61 20 through extension 64 the cam sleeve 17 revolves continuously. When therefore the "run out" key is operated blank tape is rapidly fed out as long as the key is maintained depressed and thus avoids the repeated operation of the spacing key to produce a similar result. The key 61 may be placed in any convenient position, preferably close to or in 25 the keyboard with the other key levers.

In Fig. 1 the signal transmitting contact means are shown as in the form of a spring blade 10 bent at the middle of its length around the boss of a member 65, which member is oscillated on pivot 66 in accordance with the switching operations to be effected. 30 Member 65 has two arms 67 and 68 bent as shown and adapted to retain the arms 10 of the spring blade in a strained position. Suitable contact tips on the arms of the spring blade cooperate with fixed contact screws 11 and 12. When member 65 is actuated to one position, one arm of contact blade 10 makes contact with one of the fixed screws and is sprung away from its corresponding arm 67 or 68 on member 65. When member 35 65 is actuated to the other position, the other arm of the contact blade approaches the other fixed contact screw 11 or 12 but contact between the blade 10 and the first mentioned contact screw is not broken immediately. 40 When member 65 has completed its travel the opposite arm of blade 10 has made contact with its corresponding fixed screw and been sprung away from its retaining arm 67 or 68 while the first mentioned arm has now broken contact with its fixed screw. It will be observed that the send-receive has contact means that is similarly constructed. 45

With this arrangement the period of lost contact time while the contact tongue is travelling from one position to the other can be reduced to a minimum. By altering the position of the fixed screws 11 and 12 the contact blade can even, if desired, be adjusted to make contact momentarily with both contact screws during the transit of member 65 50

from one position to the other and consequently before breaking contact with one screw and making contact with the other.

What is claimed is:

1. Telegraph apparatus comprising in 70 combination, a keyboard, a series of combination bars actuated therefrom, a series of signal impulse selecting means controlled by said combination bars, a series of punch selecting means also controlled by said combination bars, a driving shaft and two separate 75 cam sleeves independently driven from said driving shaft at different relative speeds, one for transmitting signals in accordance with the setting of said signal impulse selecting means and the other for perforating a tape in accordance with the setting of said punch selecting means. 80

2. Telegraph apparatus comprising a keyboard, a signal transmitting controlling means actuated from said keyboard, tape perforating controlling means also actuated from said keyboard, a driving shaft, signal transmitting actuating means driven from said driving shaft through individual gearing at one speed, and tape perforating actuating means also driven from said driving shaft through individual gearing means but at a speed higher than that of said signal transmitting actuating means. 85 90 95

3. Telegraph apparatus comprising a keyboard, signal transmitting means operated from said keyboard, independent tape perforating means also operated from said keyboard, a driving shaft and means for causing the driving shaft to operate either the signal transmitting or the tape perforating means at different relative speeds under the control of said keyboard. 100

4. In a combined telegraph signal transmitter and tape perforator, a keyboard, a cam sleeve for effecting signal transmission at a predetermined speed, an independent cam sleeve for effecting tape perforation at a speed differing from said predetermined speed, means operable from said keyboard for effecting the release of both said cam sleeves, and other means for causing the release of said sleeves, one at a time, under the control of said keyboard. 105 110 115

5. In a telegraphic apparatus, a keyboard, signal transmitting means operated from said keyboard, independent tape perforating means also operated from said keyboard, a rotating shaft, and means for causing said shaft to operate both the signal transmitting and the tape perforating means at different relative speeds under the control of said keyboard. 120

In witness whereof, we hereunto subscribe our names this seventh day of November, 1930. 125

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