

Aug. 7, 1934.

B. H. SMITH

1,969,045

MULTIPLE RECORDER

Filed Nov. 23, 1931

5 Sheets-Sheet 1

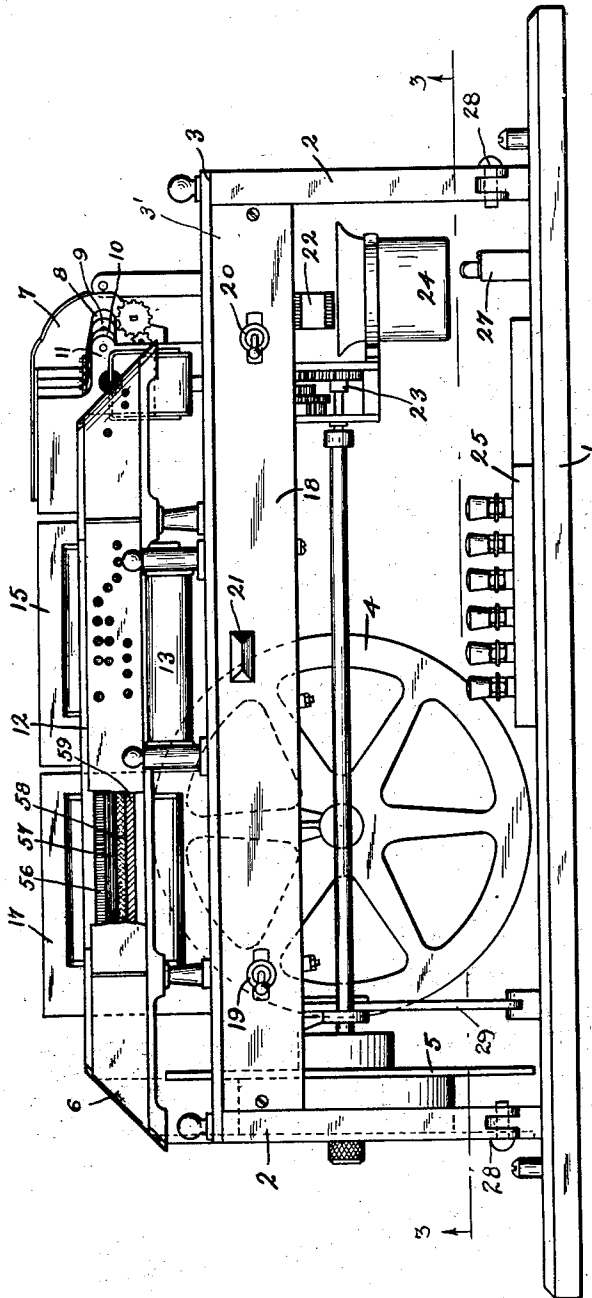


Fig. 1

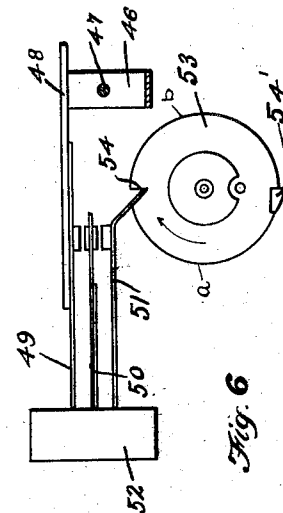


Fig. 6

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5 Sheets-Sheet 2

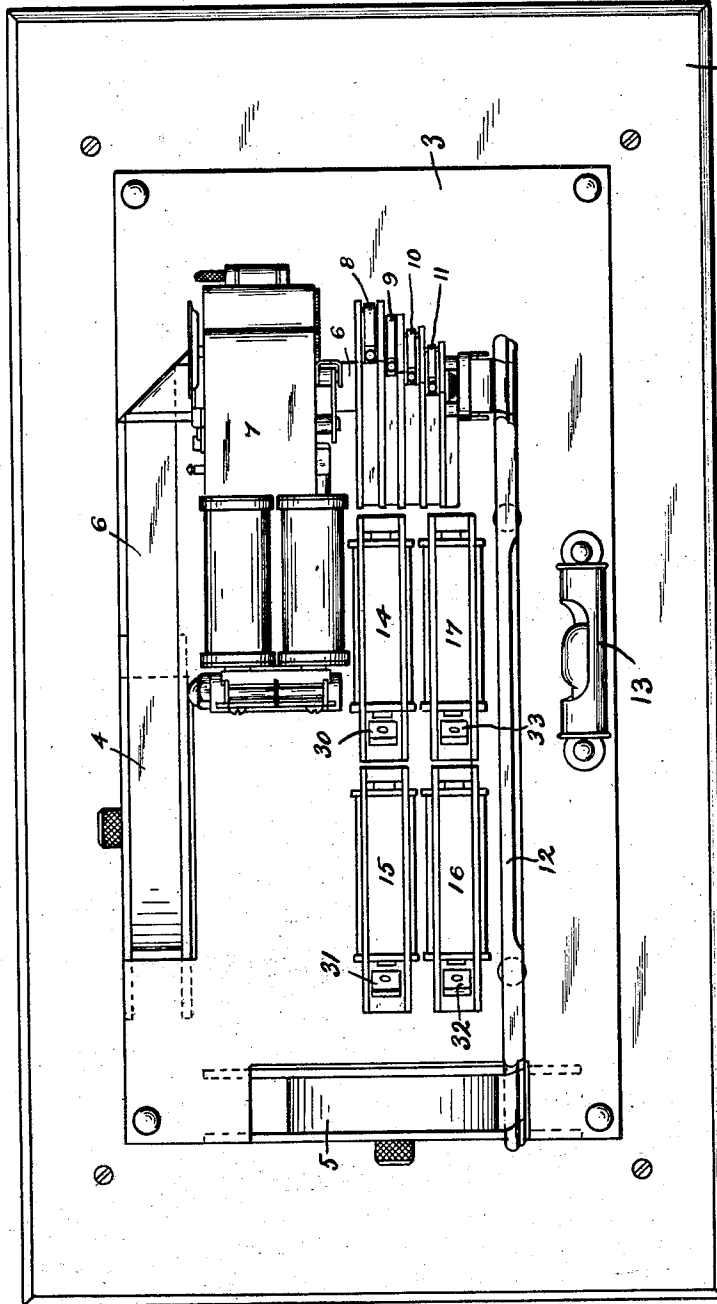


Fig. 2

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5 Sheets-Sheet 3

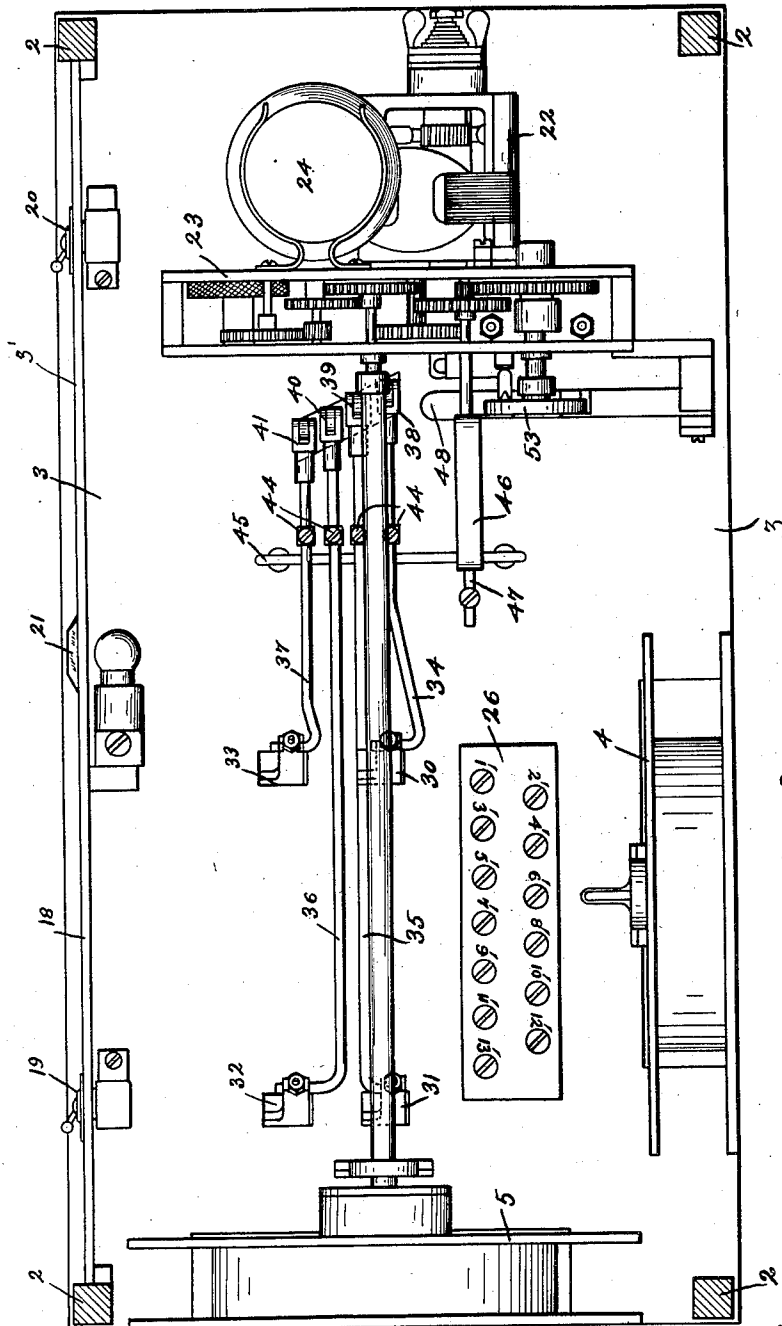


Fig. 3

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5 Sheets-Sheet 4

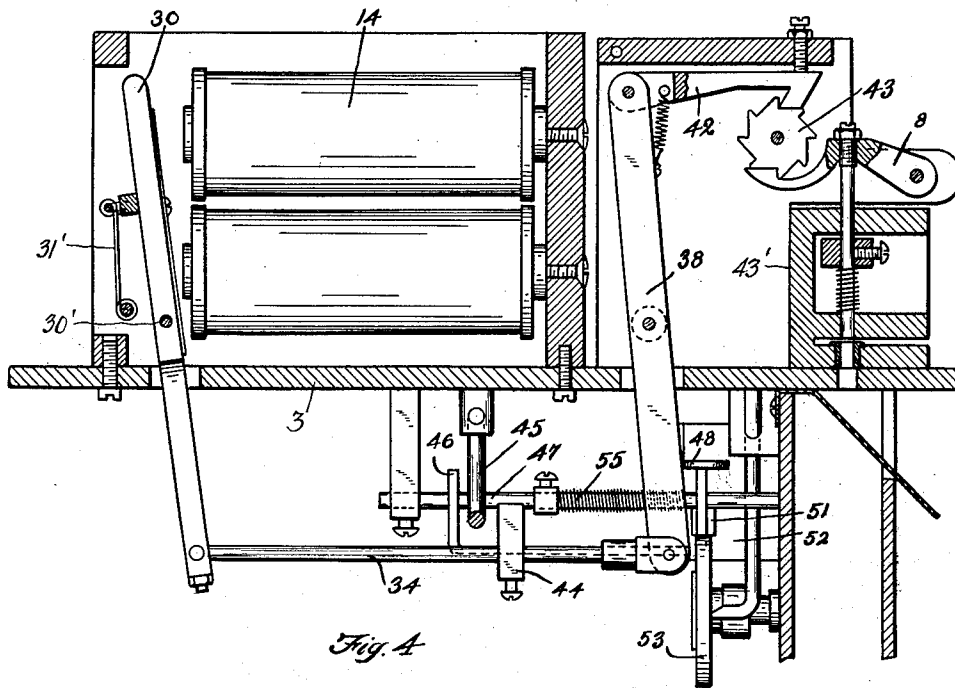


Fig. 4

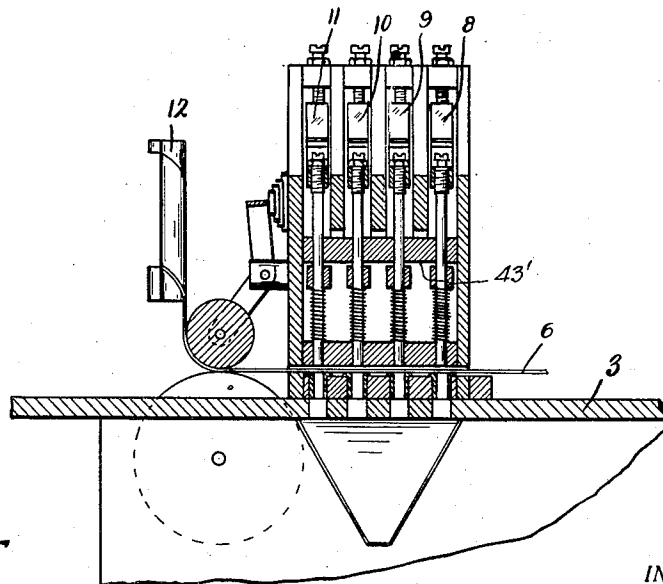


Fig. 5

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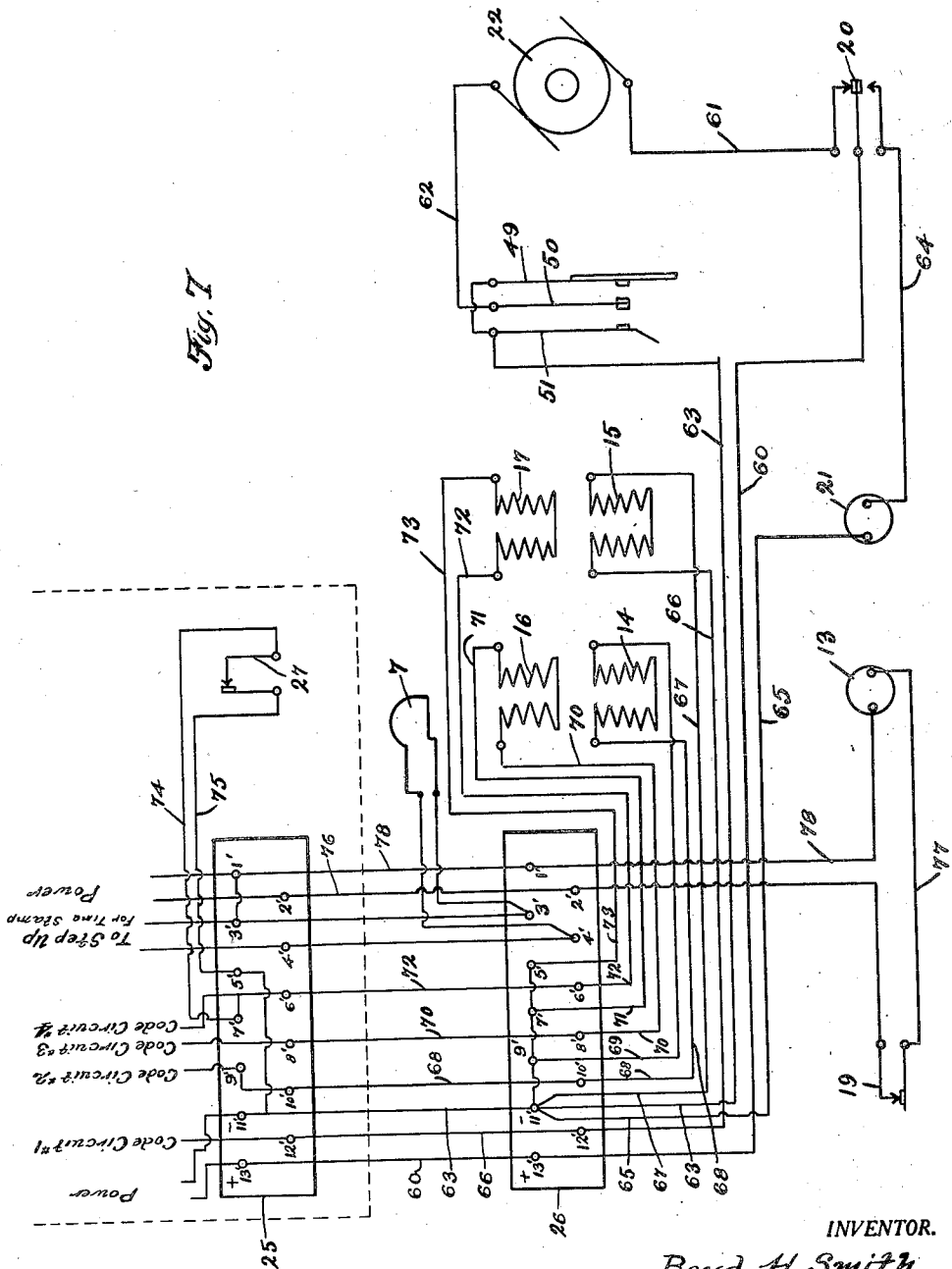
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5 Sheets-Sheet 5



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## UNITED STATES PATENT OFFICE

1,969,045

## MULTIPLE RECORDER

Boyd H. Smith, Shelby, Ohio, assignor to The Autocall Company, Shelby, Ohio, a corporation of Ohio

Application November 23, 1931, Serial No. 576,743

6 Claims. (Cl. 164—89)

The present invention relating to a code signal system, pertains more particularly to novel improvements in a multiple recording means for receiving and permanently recording the simultaneous reception of a plurality of code signals. More precisely stated, my invention embodies new and unusual structural improvements over the subject matter of my prior Patent No. 1,830,569 granted November 3, 1931 for improvements in "Recorders".

The subject matter of the present invention contemplates the provision of a multiple recording mechanism for producing upon a single record strip a plural number of code signals, which may be indicative of the operation of fire alarm boxes, watchman systems, sprinkler supervisory systems, water flow alarms, and many other installations which are too numerous to demand immediate mention.

One of the objects of the present invention is to provide means for punching record perforations in a moving record strip without interfering with the uniform motion of such strip. Another object is to provide a display panel for the passage of the record strip having a plurality of code signal perforations therein and of means associated with said strip for visibly differentiating one group of perforations from another. Another object is to provide a unique double motor circuit rendering possible the reception of any code at any time without interrupting the action of the record strip feeding mechanism, and likewise the recording of one or more codes may be simultaneously received over different circuits without interference. Still another object is the provision of means for feeding the last received code signal out of the punching mechanism and onto the display panel. Objects and advantages additional to those above enumerated shall become apparent during the following description. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a front elevational view of the general assembly of the mechanism embodying the principle of my invention; Fig. 2 is a top plan view

thereof; Fig. 3 is a bottom plan view of the under side of the top plate and taken substantially upon the plane 3—3 of Fig. 1 in the direction indicated by the arrows; Fig. 4 is an enlarged detail of the punching mechanism and operating switch; Fig. 5 is an enlarged sectional view taken at right angles through the record strip perforating punches; Fig. 6 is an enlarged view of the motor switch contacts and the switch actuating disc; Fig. 7 is a wiring diagram showing the electrical connections involved in the herein described mechanism.

#### General assembly

Referring more particularly to Figs. 1 and 2, the general assembly of the device comprises a base plate 1, which is preferably formed of ebony asbestos or similar material, and having attached thereto the four supporting posts 2 which in turn mount the top or main plate 3. The top plate 3 serves as a table for supporting the moving parts of the recording mechanism which includes the record strip feed reel 4 and the record strip take-up reel 5. The record strip 6 which is composed of a continuous paper ribbon is fed from the reel 4, passes under the time stamping mechanism 7, through the series of signal punching mechanisms 8, 9, 10 and 11, across the face of the display panel 12 and thence to the take-up reel 5. A panel lamp 13 is provided for the purpose of illuminating the display panel 12. Immediately to the rear of the display panel are positioned the punch coil units 14, 15, 16 and 17 which are mounted upon the main plate 3 and may be removed for replacement or repairs without disturbing the remainder of the associated mechanism. A vertical front panel 3' mounts upon its left hand side the panel lamp switch 19, on its right hand side the motor switch 20, and in its central portion the motor switch pilot lamp 21 which indicates when the power circuit to the motor is open. The main plate 3 also carries upon its under side the electric driving motor 22 which actuates the gear train indicated generally by the numeral 23. The detailed construction of the gear train 23, its function and operation is not herein more minutely described inasmuch as a complete description thereof will be found in my Patent No. 1,830,569 hereinabove referred to. A glass cup 24 is also provided for the reception of the punchings from the record strip. A terminal block 25 secured to the base 1 serves as a means for anchoring the several electric connections which lead to the exterior of the recorder. A similar terminal block

26 is secured to the under side of the main plate 3 and receives the various electric connections leading to the operating parts of the mechanism. A tamper switch 27 is attached to the base plate 1 and is adapted to coact with a glass cover (not shown) in such a manner as to open the tamper switch contact when the glass cover is removed and to produce a punch mark and time stamping upon the record strip so as to indicate the time and date of such removal of the cover. The electric conductors between the terminal blocks 25 and 26 are made flexible and of excess length in order to permit the tilting back of the top plate 3 upon the hinged connections 28 in the supporting posts 2. A collapsible, hinged restraining arm 29 is secured at its end to the base plate 1 and the top plate 3 and serves to limit the tilting angle of the latter.

#### *Punching mechanism*

Now directing attention particularly to Figs. 3, 4, and 5, the punching coil units 14, 15, 16 and 17 are assembled in double tandem formation, and have associated therewith the movable armatures 30, 31, 32 and 33 respectively. The last-named armatures as best shown in Fig. 4 are pivotally supported on pins, such as indicated by the numeral 30' and are provided with the retracting springs 31', the tension of which may be made adjustable.

The ends of the armatures which extend below the plate 3 pivotally connect with the links 34, 35, 36 and 37, which in turn are connected by means of clevises to the punch operating levers 38, 39, 40 and 41 respectively. As shown in Fig. 4, the upper ends of the operating levers are attached to the step-up latch 42 for operating the ratchet wheel 43 which in turn actuates the punching mechanism proper. The punching mechanisms 8, 9, 10 and 11 are independent in operation and the movement of the punches is so rapid that the uniform feed of the strip is uninterrupted irrespective of the number of punches which may be simultaneously operated. The punches are mounted in a unit block 43' which insures alignment with their respective dies and facilitates replacement of the punch blocks.

#### *Motor switch tripping mechanism*

Each of the armature connecting links 34 to 37 inclusive have mounted thereon a vertically projecting dog 44 which is adapted to bear against the transverse, pivotally suspended bar 45, upon movement of any one of the armatures 30 to 33 inclusive. The cross bar 45 in turn bears against the U-shaped latch 46 which is slidably carried upon the horizontal bar 47. As shown in Figs. 4 and 6, the opposite end of the U-shaped bar 46 normally rests under the insulated end 48 of the motor switch contact arm 49. The motor switch contact arms 49, 50 and 51 are mounted in the insulated terminal block 52 and are electrically connected in double circuit to the driving motor 22. The motor switch wheel 53 which is preferably composed of bakelite or similar insulating material has positioned upon its periphery the notch 54 and the lug 54'; the downwardly bent end of the motor switch contact arm 51 is adapted to ride upon the periphery of the motor switch wheel 53.

In operation, when a code signal is received by any one of the punch coil units, it will be seen that the motor switch latch mechanism will be tripped so that the end of the bar 46 will be moved out from under the end 48 of the contact

arm 49. The contact arm 49 having a resilient tendency to bend in a downward direction will then be free to contact with the arm 50, completing the motor circuit and starting up the driving motor. Simultaneously upon actuation of the driving motor 22, the motor switch wheel 53 will commence rotation in the direction of the arrow as indicated in Fig. 6. Immediately after the motor switch wheel 53 has begun its rotation, the lower contact arm 51 will also close with the middle contact 50, thus maintaining a closed motor circuit during a complete revolution of the motor switch wheel 53. After the motor switch wheel has revolved through the arc *a*, the lug 54' will then contact with the dependent end of the lower contact arm 51, operating to raise the upper contact arm 49 into latching position whereupon the latch 46 will again move under the insulated end 48 by virtue of the force exerted by the coil spring 55. The arc *a* is made of sufficient length to permit the reception of one complete code signal. The arc *b* is made of sufficient length to continue the operation of the driving motor 22 until the last received code signal has been moved completely out onto the display panel 12. After one complete rotation the end of the lower contact arm 51 again drops into the notch 54, opening the motor circuit and stopping the driving motor. On the other hand, if the latch 46 is again tripped by the actuation of one of the punch coil units during the cycle of rotation of the motor switch wheel 53, the motor circuit will remain closed, the record strip will continue to move for another recording cycle and another unit length of the strip will be moved out upon the display panel.

#### *The display panel*

Referring to Fig. 1, it will be seen that the individual punching mechanisms 8, 9, 10 and 11 are placed in staggered position across a width of the record strip so that the individual code perforations will occupy laterally spaced channels across the width of the strip. In order to facilitate the visible differentiation between the various code perforations there is provided upon the face of the display panel 12 a corresponding number of colored stripes 56, 57, 58 and 59, which may be red, blue, orange and green respectively. It will thus be seen that the code perforations for each individual code will have the visible appearance when passing across the display panel, of varying colors, so that they may be readily distinguished one from the other.

#### *Wiring diagram*

Fig. 7 illustrates a typical wiring diagram for the electrical connections which may be used for the above described device. Electric power is positively connected to terminals 13' of the terminal blocks 25 and 26 thence through wire 60 to the motor switch 20, wire 61, motor 22, wire 62, motor switch arm 50, motor switch arm 49, wire 63, terminals 11' and then to the negative power line. The wire 64 leads from the motor switch 20 through the motor switch panel lamp 21 to wire 65, to negative terminal 11'. The code signal circuit No. 1 is connected to the terminals 12', thence to wire 66, punch coil unit 16, wire 67 and terminals 11'. The code circuit No. 2 is connected to terminals 10', thence to wire 68, punch coil unit 14, wires 69 and terminals 11'. Code signal circuit No. 3 is connected to terminals 8' thence to wire 70, punch coil unit

16, wire 71 and then to terminals 11'. Code signal circuit No. 4 is connected to terminals 6', thence to wire 72, punch coil unit 17, wire 73 and then to terminals 11'.

5 The tamper switch 27 is connected in parallel with code circuit No. 4 by means of wires 74 and 75, whereby an actuation of the tamper switch 27 will serve to impart a corresponding actuation of the punch coil unit 17, making a single  
10 perforation upon the record strip 6. The time stamp 7 is connected to terminals 3 and 4 in turn to a step-up mechanism which receives periodic impulses from a master clock. Electric power may be connected to the terminals 1'  
15 and 2' thence through the wire 76 to the panel lamp switch 19, wire 77 to the panel lamp 13 and wire 78 back to terminals 1 completing the latter circuit.

Other modes of applying the principle of my  
20 invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

25 I therefore particularly point out and distinctly claim as my invention:

1. In a code signal recording apparatus having a movable record strip, a plurality of punching means for producing code perforations on  
30 said strip while in motion and a motor for moving said record strip, the combination of switch means for actuating said motor, an operating means for said switch associated with said punching means and adapted to operate said switch  
35 upon the movement of any one of said punching means, and means for maintaining said switch closed for a predetermined interval after the cessation of operation of said punching means.

2. In a code signal recording apparatus having a movable record strip, a plurality of punching means for producing code perforations on  
40 said strip while in motion and a motor for moving said record strip, the combination of a switch for said motor, a latch mechanism for holding said switch open, a movable trigger bar for tripping  
45 said latch mechanism, means connecting said trigger bar to each of said punching means, and means for resetting said latch mechanism and reopening said switch at a predetermined  
50 interval after the cessation of operation of said punching means.

3. In a code signal recording apparatus having a movable record strip, a plurality of punching means for producing code perforations on  
said strip while in motion and a motor for moving said record strip, the combination of link  
80 arms connected to each of said punching means, a switch for said motor, a latch mechanism for holding said switch open, a movable trigger bar for tripping said latch mechanism, projecting  
85 lugs secured to each of said link arms and adapted to engage with said trigger bar, and means for resetting said latch mechanism and reopening said switch at a predetermined interval after the cessation of operation of said punching means.

4. In a code signal recording apparatus having a movable record strip, a plurality of punching means for producing code perforations on said strip while in motion and a motor for moving  
90 said record strip, the combination of a switch for said motor, link arms connected to each of said punching means, a pivoted bar disposed transversely of said link arms, a reciprocally mounted connecting bar having one end adapted  
95 to engage with said switch and the other end adapted to be engaged by said transverse bar, projecting lugs on said link arms adapted to engage with said transverse bar, spring means urging  
100 said connecting bar towards said switch, and means for automatically moving said switch to permit said connecting bar to engage therewith.

5. In a multiple recorder of the character described having a driving motor and a plurality of record punches, the combination of a cam  
110 driven by said motor, a double acting switch for actuating said motor, and means associated with said punches for closing one side of said switch, said cam being adapted to open and close the other side of said switch.

6. In a multiple recorder of the character described having a driving motor and a plurality  
115 of record punches, the combination of a cam driven by said motor, a double acting switch for actuating said motor, latch means adapted to normally hold one side of said switch open, and  
120 means connected to said punches for tripping said latch means, said cam being adapted to reset said latch means and to maintain the other side of said switch closed for a predetermined interval thereafter.

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