June 29, 1948. A. W. BALDWIN 2,444,327

PREFERENCE RECORDER FOR PROGRAMS

Filed May 20, 1942 2 Sheets-Sheet 1

Fig. 1

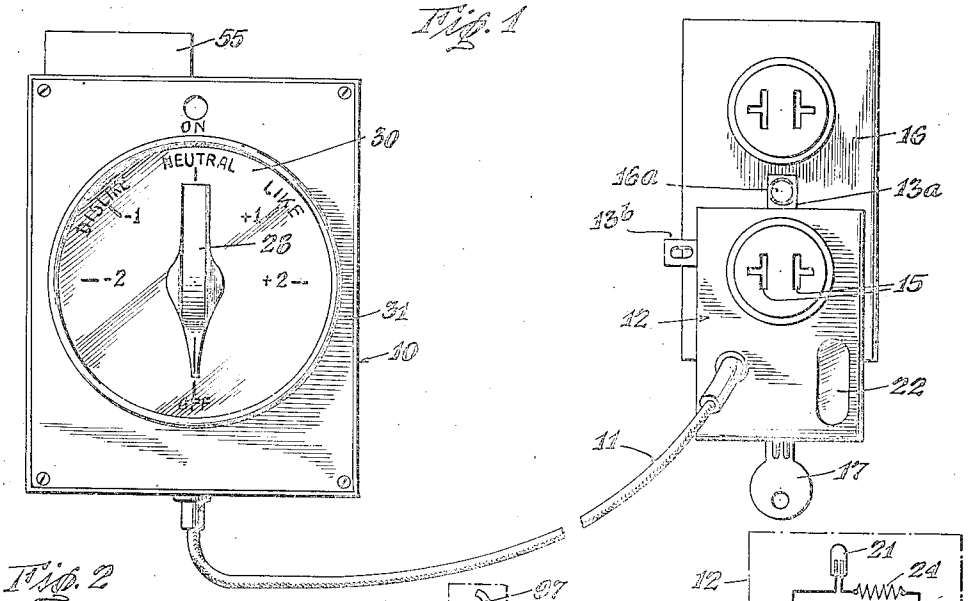


Fig. 2

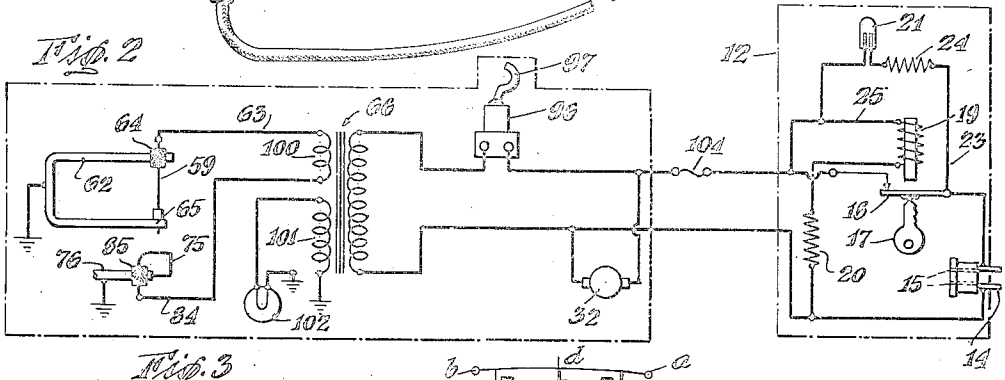


Fig. 3

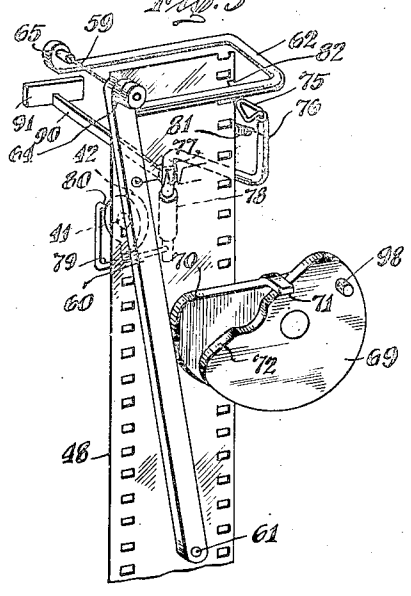


Fig. 4

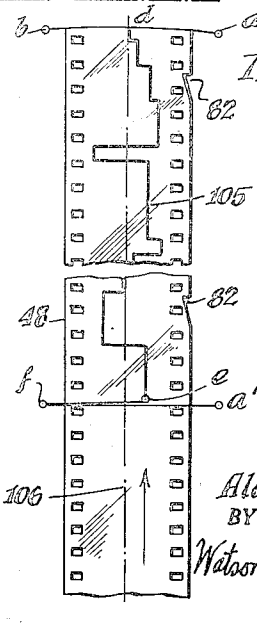
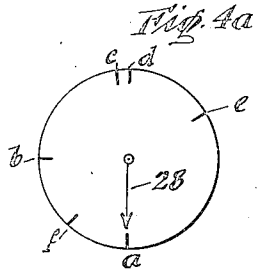


Fig. 4a



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PREFERENCE RECORDER FOR PROGRAMS

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Fig. 5

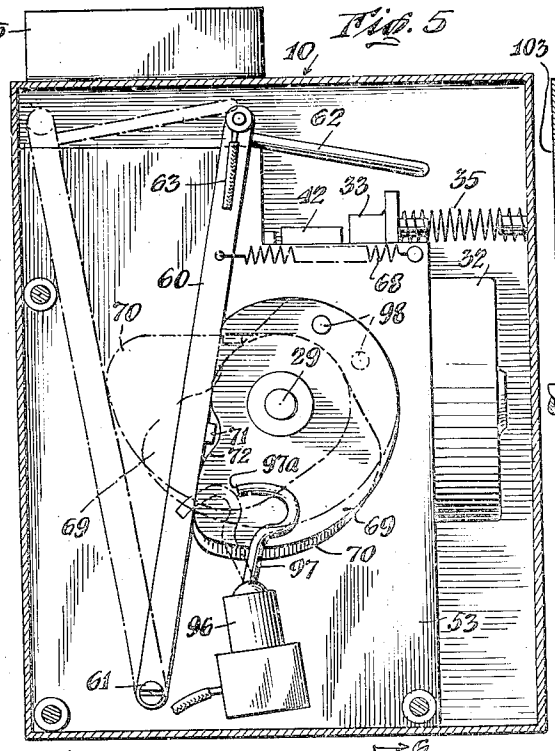


Fig. 6

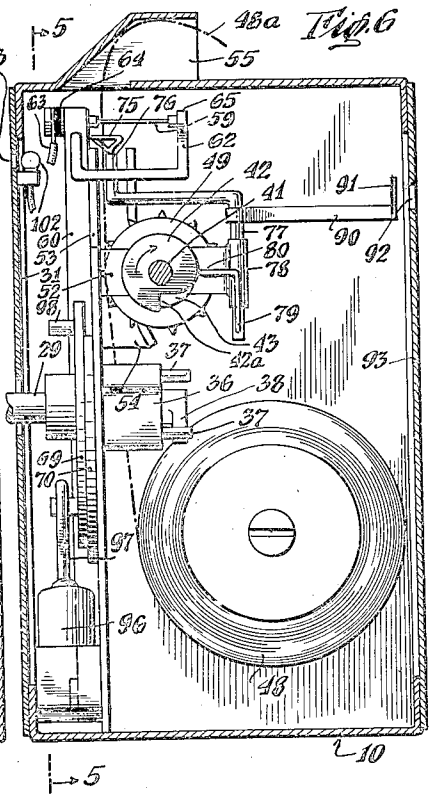
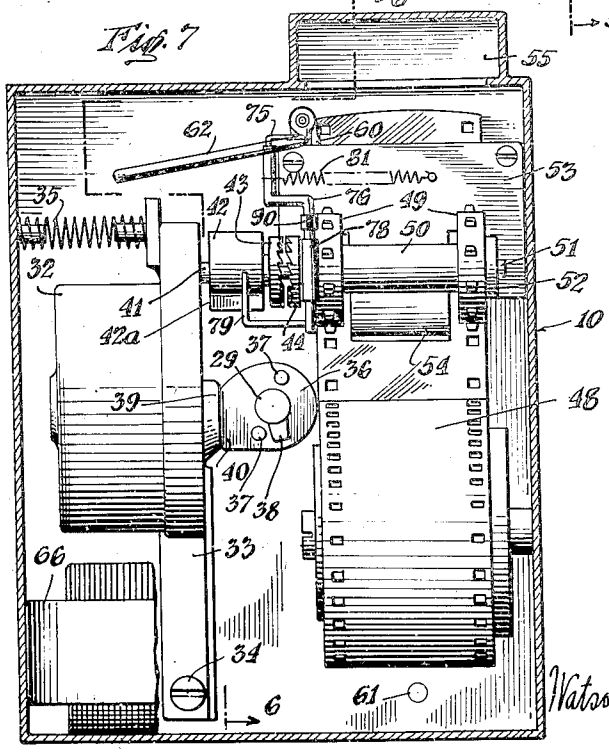


Fig. 7



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Patented June 29, 1948 2,444,327

UNITED STATES PATENT OFFICE

2,444,327

PREFERENCE RECORDER FOR PROGRAMS

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Application May 20, 1942, Serial No. 443,773

10 Claims. (Cl. 234—1.5)

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The present invention in its more general aspects relates to a preference recorder capable of use to provide a permanent record of human reaction to a program. It is particularly advantageous as a mechanism which may be readily installed at practically any location desired, as for example in a home and operated by an individual in the household while listening to a program such as a radio broadcast. The mechanism provides the individual with means which he may adjust continuously as the program progresses in accordance with his degree of like or dislike of the successive events of the program, and these adjustments are recorded as a graph which thereby is representative of his reactions to the successive events of the program associated in accurate timed relation therewith.

As depicted in the particular arrangement hereinafter described, the graph comprises a line produced upon a longitudinally fed strip of thin material, such as a thin acetate film similar in width and having the perforations of a 35 mm. motion picture film, the ordinates or transverse position indicating degree of like or dislike, and the abscissae or longitudinal units representing time, which in turn represent successive events of the program.

The apparatus embodies features whereby, after a record of a particular program is thus made, the record may be readily severed from the continuous roll of strip material and utilized in various ways. According to one particularly useful procedure the operator mails the record into a central office where it is analyzed in connection with other similar records and valuable information and statistics derived.

The apparatus, by reason of its simplified controls and character in general, may be used in its intended manner by inexperienced persons with only a few simple directions.

It embodies principles and features of construction which assure a properly timed relation whereby, in the analysis of the graph produced, the points thereof can be associated accurately with particular moments or events of the program. In addition to the features of internal construction which contribute to such results is the further characteristic that the working apparatus is completely enclosed and unitary in character, and after installation is reasonably free of tampering or disturbance of the timing factors.

Among the important features and objects are the means for producing the graph and for initiating and stopping the feed and for severing

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the graph-bearing portion of the strip at the termination of a particular program.

Various additional objects and advantages, both specific and general in character, will be apparent from the typical arrangement to be described, and the invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of which invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a general view in elevation of an apparatus typifying the invention as installed ready for operation;

Fig. 2 is a wiring diagram of the circuits of the apparatus of Fig. 1;

Fig. 3 is a perspective view of certain elements in the interior of the main casing comprising particularly the graph-forming element and the means for varying the transverse position thereof;

Fig. 4 is a view of a portion of a film bearing thereon a graph representative of that which would be obtained normally in the operation of the apparatus;

Fig. 4*a* is a diagrammatic illustration useful in connection with Fig. 4 in describing successive positions of the manually adjustable pointer;

Fig. 5 is a front view in elevation of the recording instrument with the dial removed better to show some of the internal construction taken on the line 5—5 of Fig. 6;

Fig. 6 is a cross-sectional view in elevation taken on the line 6—6 of Fig. 7; and

Fig. 7 is a view from the rear with the back cover plate removed.

The general features of the apparatus are shown in Fig. 1 and comprise a recorder box 10 connected through the cord 11 to the combined plug and relay switch 12. In the installation of the device the switch box 12 is secured in an alternating current outlet such as the normal one found in a home. For this purpose the casing 12 is provided with ears 13*a* and 13*b*, the ear 13*a* being utilized in the present typical installation and that of 13*b* being provided for use in another type of standard electrical outlet. As shown diagrammatically in Fig. 2, the box 12 has at the rear thereof a pair of prongs 14 adapted to fit into the normal plug outlet. The box 12 is pro-

vided with an auxiliary outlet 15 so that installation of the device does not deprive the home owner of any normal outlets. The attaching screw 16a, which is adapted to occupy the normal position of the screw holding the face plate 16 in position on the wall, may have a special head requiring a special tool so that the switch box 12 cannot readily be removed by unauthorized persons.

As shown in Figs. 1 and 2, a key 17 is provided designed to be inserted in an appropriate slot thereby closing the switch 18, which is then normally maintained closed by the electromagnet 19 connected across the two main leads through a connection which may include a suitable resistance 20. The switch 18 includes, of course, a part composed of iron which is attracted by the electromagnet 19 serving to hold the switch in its upper closed position against the force of its own weight when the current in the coil of the electromagnet is sufficiently large. With the arrangement shown, the circuit will remain closed unless and until there is an interruption in the main line, whereupon the switch 18 will be opened, and remain open, until closed by reinsertion of the key 17. This relay switch arrangement has a special purpose, as will be described more in detail hereinafter. When the circuit has been interrupted and the switch 18 opened the pilot lamp 21, which may be a small neon bulb, located in back of the colored glass window 22 will be lighted. With the switch 18 open the circuit for the warning light includes the line 23, the winding of low resistance of the motor 32 to be later described, and back to the other main line of the source of electric power. There is also a further circuit connection for the light in parallel with the motor winding comprising the line 23, a suitable resistance 24, the bulb 21, wire connection 25, solenoid 19 and through resistance 20 back to the other side of the circuit. The pilot lamp 21, and its resistance 24, are shunted around switch 18, and since the lamp is of high resistance practically no current will flow through it when switch 18 is closed. When, however, switch 18 is open the voltage applied to the pilot lamp will be high causing it to light. As to the switch 18, after it is manually closed by insertion of the key 17 the direct connection across the line through the coil of the electromagnet 19 and the resistance 20 will permit a relatively high current in the coil sufficient to hold the switch closed. After the circuit in the main line has been broken, however, as by removal of plug connection 14, and the connection thereafter restored, the circuit for the coil of the electromagnet 19 will comprise the line 23, resistance 24, lamp 21, line 25, electromagnet coil 19 and resistance 20 to the other side of the main power circuit. In that case, because particularly of the high resistance of the pilot lamp, the current through the coil of the electromagnet 19 will be too small to draw the switch 18 across its gap to the closed position. The circuit for the recording box 10 will be described in detail hereinafter.

Referring to the mechanical construction of the recorder contained in the case 10, there is shown a pointer 28 secured to and adapted to rotate the main control shaft 29. The pointer 28 moves over a dial 30 secured to or forming part of the front cover 31 of the box 10. The dial 30 may bear any suitable indicia, such as that shown in Fig. 1. As there depicted the dial indicates "Off" and "Neutral" positions and also intermediate positions representing degrees of like or dislike. After the device has been put into operation in a manner to be subsequently described, the operator listens to a program and adjusts the pointer 28 to various positions corresponding to his reaction to the program at any particular instant, adjustments being made from time to time as his reaction to the program changes with the successive events thereof.

The main drive motor is shown at 32 and comprises, in general, a synchronous motor connected directly to the leads from the switch box 12 so that the motor normally operates continuously regardless of the position of the control pointer 28. The motor is mounted on a swinging frame 33 pivoted at 34, being normally urged, as shown in Fig. 7, clockwise or to the right about its pivot 34 by means of the spring 35. Mounted loosely on the rear end of the control shaft 29, that is on the end opposite to the pointer 28, is a rotary cam 36 having thereon projecting pins 37 adapted to be engaged by the lug 38 secured on the rear end of the shaft 29. A lost motion is thereby provided between the rotary control shaft 29 and the angular adjustment of the cam member 36 which is adapted to control the position of the motor 32. As shown in Fig. 7 the motor frame is provided with a flat plain bearing surface 39 adapted to be engaged by the portion 40 of the cam 36 which restrains the motor in a position to the left. The motor is connected through suitable gearing to drive the shaft 41, which in turn has rigidly secured thereon, to rotate therewith, a cam 42, the purpose of which will be described hereinafter, and also a clutch drive member 43 adapted to engage the opposing clutch member 44 when cam member 36 has been rotated (counter-clockwise in Fig. 7) to a position such as to bring the portion 40 thereof out of engagement with the surface 39 on the motor casing.

The apparatus is provided with a suitable means for feeding a sheet material adapted to receive the graph. As specifically shown in the present device, this comprises a strip material such as a motion picture film, the main supply roll being shown at 45. The feeding means for the strip of film comprises a pair of sprockets 49 connected together by the tubular member 50 and mounted on the shaft 51. The shaft 51 is supported in a pair of spaced bearing brackets 52 secured to the plate 53, one of such brackets being shown at the right in Fig. 7 and the other occupying a similar position to the left of the sprockets. The shaft 51 may extend through and form a bearing for the support of the driving clutch member 43. The driven clutch member 44 is secured to and adapted to cause the rotation of the sprockets 49. An arcuate plate 54 assists in guiding the film, which is fed by the sprockets upwardly in Figs. 5, 6 and 7 and out through an exit 55, the exiting end of the film being shown at 48a in Fig. 6.

The means for producing the graph in the present specific form of the invention includes a heated wire movable in a direction transversely of the film 48 and adapted to cut a path therein extending generally longitudinally of the film but varying in its transverse position in accordance with the position of the pointer 28. Such a cutting element is shown at 59 comprising an electrical resistance wire of suitable composition such as "Nichrome." The wire is carried at the outer and upper end of a bar 60 pivoted at 61 and having secured thereto at its upper end an outer loop

member 62 designed to provide a support and electrical ground for the inner or lower end of the cutting element 59. The circuit includes an insulated wire 63, which may extend up the bar 60 from its pivot to the upper or outer end where it is connected to the resistance element 59 through an insulating bushing 64 shown particularly in Fig. 2, the current passing through the element 59 to the metal loop 62 at the point 65 (see Fig. 2) which is grounded to the frame. The source of current is from a transformer 66 (see Figs. 2 and 7), and the complete circuit through the cutting wire includes additional elements as will be described more fully shortly. The pivoted lever 60 is normally urged clockwise or to the right in Fig. 5 by means of the spring 68, its exact position being controlled during normal operation by cam means mounted on the control shaft 29. This cam means comprises a first cam 69 of progressively varying radius rigidly secured to the shaft 29, and a second cam 70 loosely mounted on shaft 29 to rotate independently. The cam 70 has an upturned lug 71 adapted to be engaged by the edge surface 72 of the cam 69, the construction comprising a lost motion connection between cam 69 and cam 70 for purposes which will be described more in detail shortly.

The construction also includes a timing means for applying timing marks to the film 48 as it is being fed, which will now be described. This likewise includes a heated wire resistance element shown at 75 carried on an arm 76 pivotally supported at 77 in a fixed bearing 78. The end of the bearing portion 77 opposite to the swinging arm 76 carries another arm 79 having a right-angled finger portion 80 adapted to engage the cam 42 heretofore mentioned mounted on the rotary shaft 41. The motor and correspondingly the shaft 41 and cam 42 rotate continuously. The finger portion 80 of the notching device just described is caused to be maintained in engagement with the cam 42 by the spring 81 connected at one end to the arm 76 carrying the resistance element 75 and at its opposite end to a suitable frame part. The cam 42 rotates in the direction of the arrow shown in Fig. 6, and once in every revolution thereof the finger 80 drops into the notch 42*a* of the cam 42 swinging the heated element 75 into engagement with the edge of the film, and then is slowly moved away from the film by the increasing radius on the cam 42 whereby a notch is produced in the edge of the film of a character similar to that shown at 82 in Fig. 4.

The electrical connections for heating the resistance element 75 are shown diagrammatically in Fig. 2 and comprise a lead wire connection 84, which passes through insulating bushing 85 located in the arm 76, the opposite end of the resistance element 75 being connected back to the metal part of the arm 76 and from there is grounded to the frame.

As shown particularly in Fig. 6, the straight bearing portion 77 of the timing device has secured thereto another arm 90 bearing at its outer end a flag 91 operated behind the window 92 located in the rear cover plate 93 of the casing where it may be observed for the purpose of initially timing the apparatus, as will be more fully described. It may be noted here, however, that when the finger 80 drops into the notch 42*a* on cam 42, the flag 91 is brought into full view before the window 92 and it is subsequently slowly swung partially or completely out of view.

A switch for controlling the circuit is shown at

96 which may conveniently be of a toggle type having a snap-over lever 97 adapted to be moved to the left in Fig. 5 to the closed position by the stud 98 secured on the cam 69, and moved to the right to its open position by engagement of the face 97*a* thereof by the bar 60 when the bar moves to its extreme clockwise position, that is, to the right in Fig. 5.

The circuit under the control of the switch 96 is shown more clearly in Fig 2. It includes a transformer 66 having a secondary coil 100 for the heating elements 59 and 75 which are in series, and another secondary coil 101 providing a source of electric power for the pilot light 102. As shown in Fig. 6, the pilot light 102 is mounted to the rear of a window 103 in the front cover plate 31 which may have a suitable colored glass therein. The pilot light indicates when the circuit to the heating elements is closed and the device ready for operation. As is also shown in Fig. 2, the motor 32 is connected directly across the line and is not under the control of switch 96 and, accordingly, the motor operates continuously while the relay switch 18 remains closed. A suitable fuse shown diagrammatically at 104 may be inserted in the line.

Having described the structural features of the apparatus, it is believed that the general arrangement and relation of the parts will be made particularly clear by describing its operation through a complete typical cycle. It will be assumed that the pointer 28 is in the "Off" position as shown in Fig. 1 and correspondingly that the bar carrying the cutter element 59 is in the full line position shown in Fig. 5. The various successive positions of the pointer are shown in Fig. 4*a* and the corresponding positions of the cutter element 59 in Fig. 4. The initial "Off" position just described is designated position *a* in these two figures. Assuming that the operator is going to use the device in connection with a radio broadcast and that the program has begun or is about to begin, the device is put in operation by turning the pointer clockwise. During the initial movement of about 90 degrees to position *b*, the upper cam plate 69 will have engaged the lug 71 of the follower cam 70 and rotated the latter to the dotted line position of Fig. 5 moving the bar 60 to the extreme left and correspondingly moving the cutter element 59 to the position *b* in Fig. 4. In this movement the cutter element will pass beyond and free of the end of the film which will have been cut off along some line represented by *a*—*b* in Fig. 4 in the last previous operation of the device.

Continuing the rotation of the pointer clockwise to a point approximately that shown at *c* causes a pin 98 on cam plate 69 to engage against the arm 97 of toggle switch 96 snapping the arm to the left and closing the circuit to the transformer, which causes current to flow in the resistance wires 59 and 75 and also illuminates the pilot light 102. In its position to the left, the arm 97 is out of the path of pin 98 in its further back and forth movement. Continuing the rotation of the pointer to the "Neutral" position in Fig. 1 indicated at *d*, Fig. 4*a* causes the lug 38 on the lower end of the control shaft 29 to engage the upper pin 37 on cam 36 as shown in Fig. 7, rotating the cam counter-clockwise in that figure, permitting spring 35 to swing the motor frame to the right engaging clutch members 43 and 44, which starts the feed of the film 48.

It will be noted that during the rotation of the pointer from position *b* to position *c*, the lower

cam plate 70 will have passed its high point and the spring pressure on the bar 60 has forced the loose plate 70 around in advance of the cam plate 69 whereby cam plate 70 no longer functions and the bar 60 from this point on bears against and follows the upper cam plate 69. The device is now operating, the film being fed constantly at a slow rate, and the operator from time to time adjusts the pointer back and forth between the points marked minus 2 and plus 2 in Fig. 1, and, accordingly, the heated cutter element 59 proceeds along some such path as indicated by the line 105 in Fig. 4 severing the film along that line. The "Neutral" or midpoint is indicated by the line 106. The film should be of non-inflammable material such as the cellulose acetate type.

At regular intervals, that is, once every revolution of the cam 42, the notcher or timer wire 75 is brought into engagement with the edge of the film producing a cut-out notch therein resembling that shown at 82 in Fig. 4 as heretofore mentioned. The rate of film feed may, by suitable proportioning and arrangement, be made substantially any value desired but normally will be relatively slow. Correspondingly, the apparatus may be designed to operate the timing element at whatever intervals desired. As illustrative, ten minute intervals have proved satisfactory, the film being fed three inches in such interval.

Assuming the device has been operated through a program and that at the end thereof the pointer occupies some such position as indicated at *e*, and the operation is to be terminated, the operator merely turns the pointer in a counter-clockwise direction to the "Off" position. During this movement, and at a point substantially before the "Off" position is reached, the lug 38 on the lower end of the control shaft 29 engages one of the pins 37 and rotates the cam 36 clockwise, in the rear view of Fig. 7, to the position there shown, disengaging the clutch plates 43 and 44 and stopping the feed of the film. During this same rotation of the pointer the upper cam plate 69 will engage the lug 71 on cam plate 70 rotating the plate 70 to a position such as shown in Fig. 3 moving the arm 60 to its extreme left-hand position and bringing the cutter wire 59 outside the left edge of the film to the position represented by *f* in Fig. 4. The relation preferably should be such that the cam 36 has released the clutch drive to the film a little in advance of position *f*. The positions for cams 69 and 70 corresponding to position *f* are shown in Fig. 3, and also in dotted lines in Fig. 5. Continued counter-clockwise rotation of the pointer from position *f* to the position *a* brings the high point of the cam 70 below dead center, whereupon the cam plate 70 is advanced by the pressure of the bar to a position such as shown in full lines in Fig. 5. During this latter movement of the bar 60 under the pressure of the spring 68 the bar engages against the face 97*a* of the toggle switch lever snapping the switch to the right to its "Off" position. In this same movement of the bar 60 from the extreme left-hand to the extreme right-hand position, the heated wire 59 moves entirely across the film severing the portion bearing the graph along some such line as that indicated at *f*—*a'* in Fig. 4. It will be appreciated that the operation from the point *e*, that is, when the operator determines to shut off the device, comprises merely a rapid continued movement of the pointer through less than a complete rotation, and that accordingly the events just described occur very quickly and that the cutter wire is in substance snapped across the film under the pressure of the spring 68.

The portion of the film which has been cut off and which bears the record graph is now available for analysis and whatever use thereof that is desired. The apparatus and additional film therein are available and ready for operation in connection with other programs whenever desired.

Proper initial installation of the apparatus assures that the graph can be accurately associated with the events of the program. Assuming, for example, that the time marker operates at ten minute intervals, the motor is so set that this operation comes exactly on, and is synchronous with, the ten minute periods of a time clock. This may be accomplished easily, as follows: The switch plug 12 is inserted in the alternating current outlet and the key 17 inserted, closing the switch and starting the operation of motor 32. Close observation of window 92 is then maintained and the instant the finger 89 drops into cam notch 42*a* causing flag 91 to move into full view before window 92, the switch box 12 is pulled out stopping the motor. The switch plug is then restored to the socket and secured therein, but this of course does not start the motor until the key is inserted. The installer then refers to an accurately set watch or clock and at the exact instant of a ten minute period on the clock again inserts the key starting the motor. Thereafter the time marker will operate on exactly the ten minute time periods of the clock, that is, for example, at 7:00; 7:10; 7:20, etc. With such a setting there is no necessity that an operator subsequently in making a record of a program start at exactly the beginning of the program. If, for example, the particular program of interest is on from 7:00 to 7:30 o'clock and the operator starts the device at 6:55 and shuts it off at 7:33, the notches will show the area of the film representing the program. In this respect it may be noted that every program has what are termed "high spots," that is, events which are liked very much, or "low spots" which are disliked very much, and which may be recognized very readily and the graph easily associated in the proper time relation with the program.

Except for the pointer and dial the recorder 10 may be a closed sealed instrument, and the cord 11 may comprise a permanent connection between the boxes 10 and 12 with no external detachable connections, and as so arranged the apparatus comprises a substantially light weight, portable, unitary device. Also with the box 12 locked in place, and the apparatus correctly set, the device is substantially non-tamperable. If, for example, there should be an interruption in the electrical circuit, causing switch 18 to open, closing of the switch and resumption of operation of the motor can be effected only by use of the key in the possession of someone authorized to start and time the apparatus. This prevents unauthorized persons restarting the motor at some indefinite time which would be out of phase with the ten minute time intervals.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or

shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device for recording the reaction of a person to a program embodying means therein for continuously feeding a strip of sheet material during the rendition of a program, means adapted to be manually operated successively in accordance with a person's reaction to the successive events of a program, means for recording on said advancing strip the successive adjustments effected by the operator to produce thereby a continuous record of the person's reactions to a particular program in timed relation with the successive events thereof, and means under the control of said manually operated means operable to sever the portion of the strip bearing said record.

2. A device for recording the reaction of a person to a program embodying as a single unit, means for continuously feeding a sheet of material, an element adapted to be adjusted manually by the person in accordance with the person's reaction to the successive events of a program being rendered, means for recording on said material the successive positions of said element, and means under the control of said element for separating and removing from the unit the material bearing said record.

3. A recording mechanism embodying in combination means for feeding longitudinally a strip of thin material adapted to record a graph, a cutting device adapted to be maintained at selectively adjusted transverse positions in the path of feed of said strip during advancement thereof, said material being of a character to be readily severed thereby, and manualy controlled means for determining the position of said device in said path of feed and for causing it to move completely across said path to sever an advanced graph containing portion of the strip.

4. A recording device embodying in combination means for feeding a sheet of thin material, a cutting device adapted to be maintained in the path of feed of said sheet during advancement thereof, thereby making a record, comprising a thin electrical resistance element with electrical connections for heating it, said material being of a character to be readily severed by said heated element as the material is fed, and means for manually adjusting at will said element transversely to said direction of feed.

5. A recording device having in combination means for feeding a sheet of recording material, a graph producing means mounted for movement transversely to the direction of feed, spring means for urging said graph means in one direction, a rotatable first cam operative to control the position of said graph means and to move it in the opposite direction against the spring pressure, and a second rotatable cam having a lost motion connection with said first cam and operative at predetermined points in the rotation of the first cam to assume the control of said graph means.

6. A recording device having in combination means for feeding longitudinally a strip of recording material, a recording element therefor mounted for movement transversely of said strip, a first adjustable cam means operative to control the transverse position of said element, a second adjustable cam means associated with and having a lost motion connection with said first cam, and effective upon a predetermined movement of said first cam means to assume control of said element and move it outside the path of feed of said strip.

7. A recording device having in combination means for feeding longitudinally a strip of recording material, a recording element therefor mounted for movement transversely of said strip, spring means for urging said element in one transverse direction, a first rotatably mounted adjustable cam means for moving said element in the opposite direction against the urging of said spring means and for controlling the position of said element, a second adjustable cam means rotatably mounted concentrically with said first cam means and having a lost motion connection therewith and operative under predetermined conditions to assume control of the position of said element, said first cam means being effective normally during feeding of said strip to control the position of said element and the contour of the graph produced, and said second cam means being engaged upon a predetermined movement of the first and moved thereby to a position where it is effective to move said element to a position at one side beyond the path of said strip.

8. A recording device embodying in combination means for feeding longitudinally a strip of thin material, a cutting device adapted to be positioned in the path of feed of said strip comprising a thin electrical resistance element with electrical connection for heating it, said material being of a character to be severed readily by said heated element, spring means for urging said element transversely in one direction, a first rotatably mounted adjustable cam means for moving said element in the opposite direction against the urging of said spring means and for controlling the position of said element, a second rotatably mounted adjustable cam means having a lost motion connection with said first cam means and operative under predetermined conditions to assume control of the position of said element, said first cam means being effective normally during feeding of said strip to control the position of said element and the contour of a graph cut therein, and said second cam means being engaged upon a predetermined movement of the first and rendered effective thereby to move said element to a position at one side beyond the path of said strip, and upon continued movement of said second cam means to a point of engagement beyond its maximum radius to permit said element to be shifted automatically under the urging of said spring means to a position at the opposite side of said strip beyond its path and thereby to cut off the portion of the strip bearing the graph.

9. A recording mechanism embodying in combination means for feeding a strip of thin material, a cutting device adapted to be positioned in the path of feed of said strip comprising a thin electrical resistance element with electrical connections for heating it, said material being of a character to be severed readily by said heated element, manually adjustable means for controlling the position of said element transversely of said strip for producing a graph thereon, a switch for controlling the circuit to said element, and connections for operating said switch from the movement of said manually adjustable means.

10. A recording mechanism embodying, in combination, means for feeding a strip of thin sheet

material, a cutting device adapted to be maintained in the path of feed of such sheet during advancement thereof, said cutting device comprising a thin electrical resistance element with electrical connections for heating it, the relation being such and said material being of a character such that the strip is cut completely through by said heated element along a path extending generally in a longitudinal direction of the strip, and means for manually effecting at will during the feed of said sheet a relative adjustment between said strip and element transversely to the direction of strip feed in a plane parallel to the surface of the strip.

ALAN W. BALDWIN.

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1,445,992	Cameron	Feb. 20, 1923
1,459,644	Watson	June 19, 1923
1,492,559	Ewing	May 6, 1924
1,732,718	Gluer	Oct. 22, 1929
1,765,988	Mayer et al.	June 24, 1930
1,810,987	Schmitt	June 23, 1931
1,947,816	Waite et al.	Feb. 20, 1934
1,961,170	Robinson	June 5, 1934
2,004,041	Driver	June 4, 1935
2,153,317	Sigo	Apr. 4, 1939
2,157,584	Woodruff	May 9, 1939
2,181,728	Greentree	July 24, 1939
2,298,608	Bates	Oct. 13, 1942