Feb. 9, 1960 K. DAWKINS ET AL 2,924,817

AUTOMATIC SAFETY-BELT SIGN

Filed March 12, 1956

Fig. 1

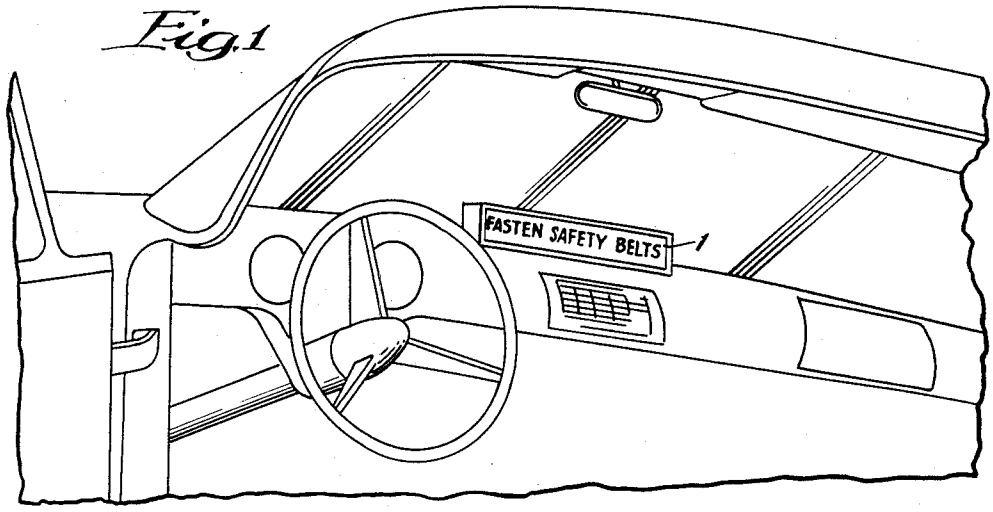


Fig. 2

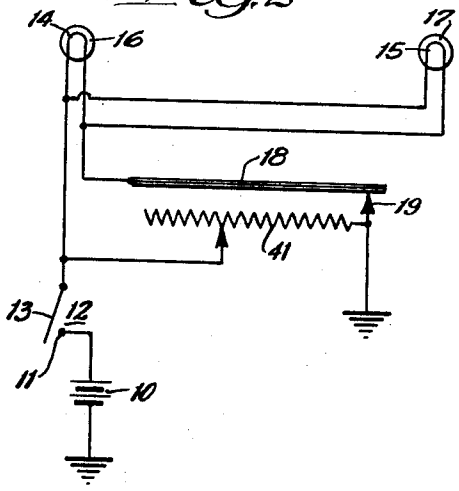


Fig. 3

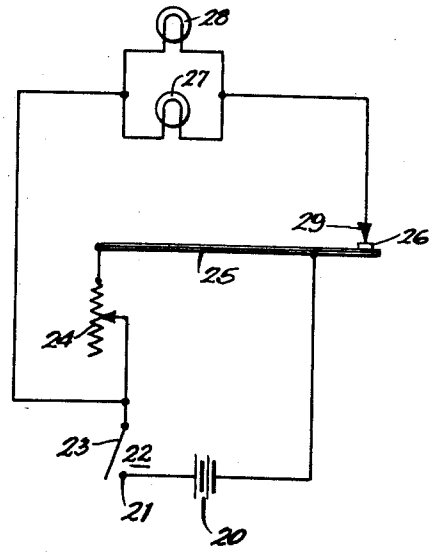
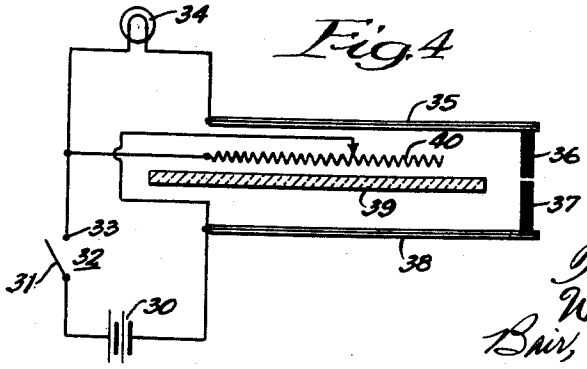


Fig. 4



INVENTOR:
Kenneth Dawkins,
William C. James
Bair, Freeman & Molinare
ATTORNEYS.

United States Patent Office 2,924,817
Patented Feb. 9, 1960

2,924,817

AUTOMATIC SAFETY-BELT SIGN

Kenneth Dawkins, Minneapolis, and William C. James, Wayzata, Minn., assignors to Franklin Manufacturing Company, Inc., Minneapolis, Minn., a corporation of Minnesota

Application March 12, 1956, Serial No. 570,905

5 Claims. (Cl. 340—377)

This invention relates in general to automatic timing systems and more particularly to an improved system for energizing an electrical circuit for a given period of time and for automatically de-energizing the electrical circuit at the end of said given period of time.

Accordingly, it is an object of this invention to provide an improved timing system.

It is a further object of this invention to provide an improved timing system which automatically initiates an information display operation in a vehicle.

It is a still further object of this invention to provide an improved timing system which automatically terminates the information display operation after a predetermined period of time.

It is another object of this invention to provide an improved timing system which is simple, inexpensive and requires relatively few moving parts and is adaptable to existing vehicles.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the novel automatic timing system whereby the objects contemplated are attained is hereinafter set forth. The various features of novelty which characterize this invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and its advantages, reference is had to the accompanying drawing and descriptive matter in which is illustrated and described a specific illustrative embodiment of the invention.

In the drawing:

Figure 1 is a pictorial view of the interior of a vehicle showing an information display device in accordance with the invention;

Figure 2 is a schematic diagram of the electrical circuit of one embodiment of the automatic timing system;

Figure 3 is a schematic diagram of the electrical circuit of another embodiment of the automatic timing system; and

Figure 4 is a schematic diagram of the electrical circuit of still another embodiment of an electrical timing system.

Referring now to the drawing, there is shown in Figure 1 the interior of a passenger carrying vehicle which advantageously may be an automobile, a bus, or the like. A housing **1**, preferably with an illuminating means such as a filament lamp positioned therewithin, is mounted within the vehicle such that the information to be displayed is within the line of sight of the passengers. This information, as desired, may be statements such as—No Smoking—, Fasten Safety Belts—, or any other information which it is desired to call to the attention of the passengers. It has been found that housing **1** advantageously may comprise a semi-flexible plastic such as polyethylene, for attachment to the visor or windshield, or alternatively may comprise a metal chassis if rear-dash window mounting is desired.

In accordance with an aspect of this invention, the

information display device is illuminated for a predetermined period of time starting at the time the operator of the vehicle places the key into the ignition switch for beginning operation of the vehicle. One circuit for carrying out this object is shown in Figure 2 of the drawing and comprises a source of potential **10** which advantageously may be a battery normally forming the part of the vehicle electrical system. One terminal of battery **10** is connected to a contact **11** of the ignition switch **12**. The other contact **13** of ignition switch **12** is connected through a resistance **41** to the other terminal of battery **10**. Also connected to contact **13** of ignition switch **12** are filaments **14** and **15** of illuminating devices or lamps **16** and **17** respectively. Connected to the other side of the filaments **14** and **15** is a bimetal member **18** which is held in normally closed relation with a contact **19** connected to said other end of source of potential **10**.

The bimetal member **18** may be of any type well known in the art and advantageously comprises the combination of two strips of metal each having a different temperature coefficient of expansion. Thus, as is well understood, when the temperature of the bimetal member is increased, one of the metal strips will expand a different amount than the other and thereby cause the bimetal member to curve upwardly away from contact **19** thereby to open the circuit to lamps **16** and **17**.

In the operation of the device, the automobile ignition switch **12** is closed by the operator when he first puts the vehicle into motion. This action completes a first circuit through resistance **41** and completes a second circuit through the lamps **16** and **17** and the bimetal member **18**. Thus, at this time the information which it is desired to display is illuminated and called to the attention of the passengers of the vehicle. As the current continues to flow through resistance **41** and heat is generated and radiates therefrom to the bimetal member **18**, the latter expands and moves away from the contact **19** to open the circuit of lamps **16** and **17** and darken the information display device. The bimetal member **18** will remain in the open position as long as the current is allowed to flow through resistance **41** or until the ignition switch **12** is returned to the off position.

In accordance with a feature of this invention, the timing characteristics of the circuit are controlled by the value of the resistance **41**, the voltage value of potential source **10**, the spacing between the resistance **14** and the bimetal member **18**, the material used to fabricate bimetal member **18** and the tension which is applied to the bimetal member. Thus any desired timing interval may be attained by properly adjusting one or more of these factors. Advantageously, resistance **41** is made variable for ready and simple adjustment of the timing interval.

Figure 3 of the drawing shows another embodiment of the automatic timing system which utilizes the bimetal member itself as the heating element. This circuit comprises a source of potential **20**, one terminal of which is connected to contact **21** of ignition switch **22**. The other contact **23** of ignition switch **22** is connected through a resistance **24** to one end of the bimetal member **25**. A contact **26** is positioned a spaced distance away from the said one end of bimetal member **25**, which contact is connected to the other terminal of potential source **20**. A pair of lamps **27** and **28** shown connected in parallel in Figure 3 may be connected between contacts **23** of the ignition switch **22** and contact **29**, which is held in normally closed relation with contact **26**.

In the operation of this embodiment of the invention, when ignition switch **22** is closed by the operator cur-

rent is caused to flow from potential source 20 through resistance 24 and the bimetal member 25. Due to the normally closed relation of contacts 26 and 29, current also is caused to flow from potential source 20 and the closed ignition switch 22 through the pair of lamps 27 and 28. As current continues to flow through the bimetal member 25, it is heated and expands, and thereby causes contacts 26 and 29 to open. This results in the de-energization of lamps 27 and 28 which are held in the off condition so long as current flows through the bimetal member 25 or until the ignition switch 22 is returned to the off position.

In accordance with a still further feature of this invention, two bimetal members may be used in the place of the single member embodiments described heretofore to compensate for changing ambients which may be encountered in service. This circuit comprises a source of potential 30 which has one terminal thereof connected to a contact 31 of the ignition switch 32. The other contact 33 of ignition switch 32 is connected through a resistance 40 back to the other terminal of potential source 30. Contact 33 also is connected through a lamp 34 to a first bimetal member 35, normally closed contacts 36 and 37 and a second bimetal member 38 back to the source of potential 30. Advantageously, resistance 40 may be a wire wound around first bimetal member 35, or alternatively, an insulator 39 may be disposed intermediate the resistance 40 and the second bimetal member 38.

In the operation of the embodiment of Figure 4, the closure of the ignition switch 32 causes current to flow through one circuit comprising the lamp 34 and the two bimetal members to illuminate the information display device. Current also is caused to flow through a second circuit comprising the resistance 40. As current continues to flow through resistance 40, heat is generated and radiated therefrom to cause the temperature of the bimetal member 35 to rise and thereby open contacts 36 and 37. As in the previously described embodiments, these contacts will remain open to hold lamp 34 in a de-energized condition as long as resistance 40 is energized or until ignition switch 32 is returned to the off condition.

The purpose of the two bimetal members is to compensate for changing ambients of temperature in the air in which the device is used. Thus, when two bimetal members are used, each tracks the other as the ambient shifts. Therefore, in accordance with the invention, when heat is applied to bimetal member 35 and not bimetal member 38 due to the thermal insulation of the latter, the interval of opening remains the same since the pressure between contact points 36 and 37 always is constant regardless of the prevailing ambient.

While several embodiments have been shown and described herein, it will be understood that they are illustrative only and not to be taken as a definition of the scope of the invention, references being had for this purpose to the appended claims.

I claim as my invention:

1. An automatic timing system comprising a first circuit including a source of potential, a heating element and switching means connected to said source of potential and said heating element for causing current to flow through and thereby heat said heating element, and a second circuit connected in parallel with said heating element including a visible signal load connected to one end of said heating element, first temperature responsive means including a bimetal connected to said load and in operative relation to said heating element, second temperature responsive means including a bimetal connected to the other end of said heating element, and a pair of contacts, each connected to one of said temperature responsive means and controlled thereby to be placed in contact with each other for closing said second circuit when the heating element is not heated and for opening said second circuit a predetermined period of time after current is caused to flow through said heating element.

2. An automatic timing system in accordance with claim 1 wherein said heating element comprises a resistance and further comprising means for varying said resistance to selectively determine the duration of said predetermined period of time.

3. An automatic timing system in accordance with claim 1 further comprising means for thermally insulating said second temperature responsive means from said heating element.

4. An information display system comprising a housing, a translucent information bearing member disposed within said housing, illuminating means within said housing in cooperative relation with said information bearing member, and a circuit for energizing said illuminating means comprising a source of potential, a heating element and temperature responsive switch means connected to said source of potential and said illuminating means, said temperature responsive switch means including a pair of bimetal members, a pair of contacts each connected to one of said bimetal members and adapted to be controlled thereby to be placed in contact with each other, said heating element being in heating relation with only one of said bimetal members so that an increase in temperature of said heating element causes said contacts to open and thereby de-energize said illuminating means.

5. In a system for selectively illuminating a translucent information bearing member, the improvement of automatic timing apparatus comprising illuminating means adapted when energized to illuminate the information bearing member, a bimetal switch having a pair of contacts which are closed when the bimetal is not heated and which are opened by the heating of the bimetal, a source of potential, a power switch, circuit means connecting said illuminating means, said bimetal switch, said source of potential and said power switch in a series circuit such that closure of said power switch causes current to flow through the series circuit to energize said illuminating means, a resistance heating element positioned in heating relation to said bimetal switch and connected in parallel with said illuminating means and said bimetal switch such that closure of said power switch to energize the illuminating means also causes current simultaneously to flow through said heating element, and selectively operable means for varying the resistance of said heating element to adjust the current flow therethrough, whereby the heating of the bimetal switch, and therefore, the energization time of said illuminating means, may be selectively adjusted to a predetermined time interval.

References Cited in the file of this patent

UNITED STATES PATENTS

1,826,477	Olpp	Oct. 6, 1931
1,830,578	Vaughan	Nov. 3, 1931
2,076,987	Edwards	Apr. 13, 1937
2,427,444	Colombo	Sept. 16, 1947
2,502,180	Smulski	Mar. 28, 1950
2,562,272	Hollins	July 31, 1951
2,698,180	Hersh	Dec. 28, 1954