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Stalp

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[54] **STARTER GUN ATTACHMENT**

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[52] **U.S. Cl.** **340/323,** 58/39.5, 340/261

[51] **Int. Cl.** **G07c 1/24**

[58] **Field of Search** 340/323, 261; 58/39.5, 74; 200/61.01

[56] **References Cited**

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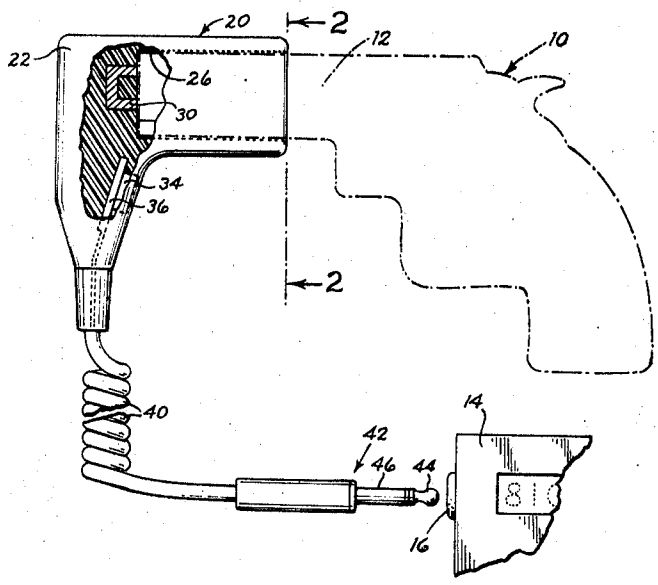
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[57] **ABSTRACT**

Sound-actuated apparatus for controlling an electrically operated device in response to the firing of a gun remote from the device. The apparatus includes a housing having a magnet mounted thereon for detachably securing it to a gun. A microphone, and an electrical circuit connected thereto, are mounted in the housing for detecting the firing of the gun and for producing an electrical signal at output terminals of the circuit on detecting such firing. An elongated, flexible conductor is connected at one of its ends to the output terminals of the circuit and has a plug at its other end for detachably and operatively connecting it to a remote electrically operated device.

8 Claims, 3 Drawing Figures



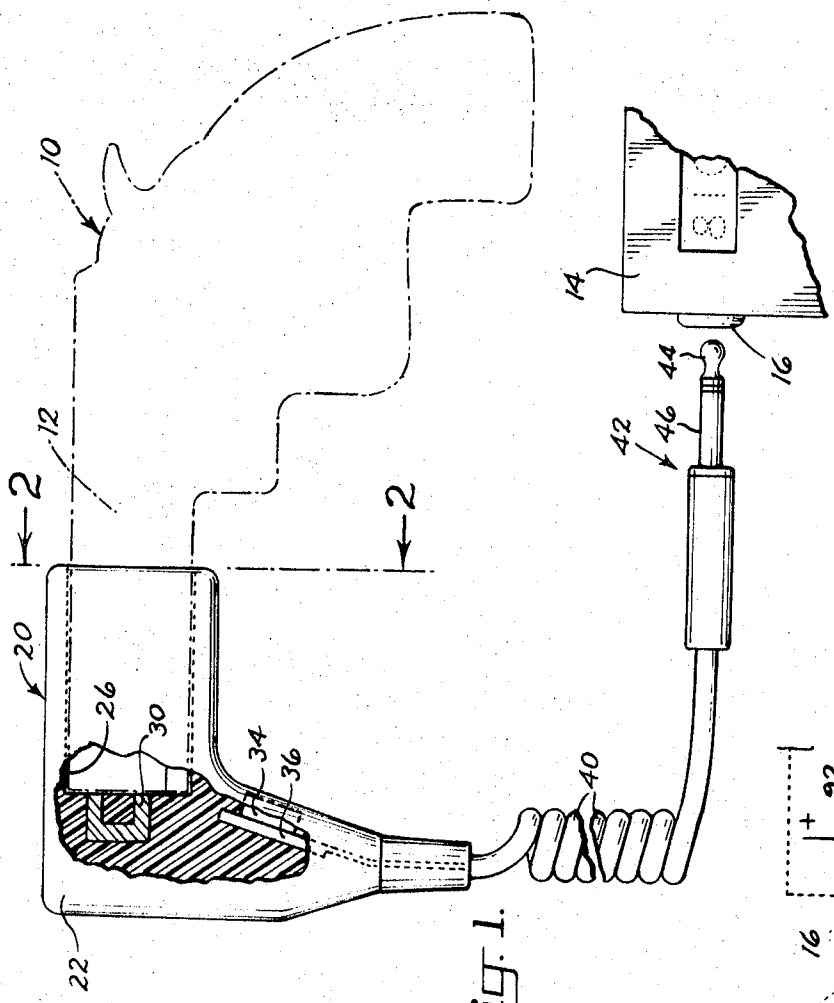


Fig. 1.

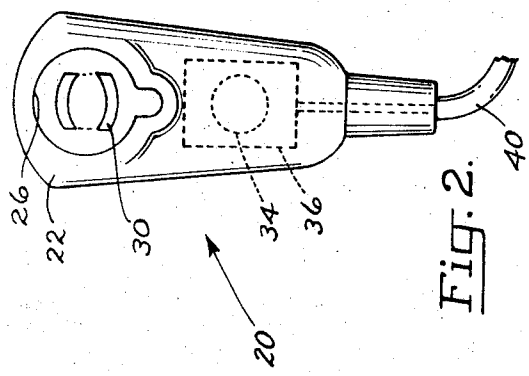


Fig. 2.

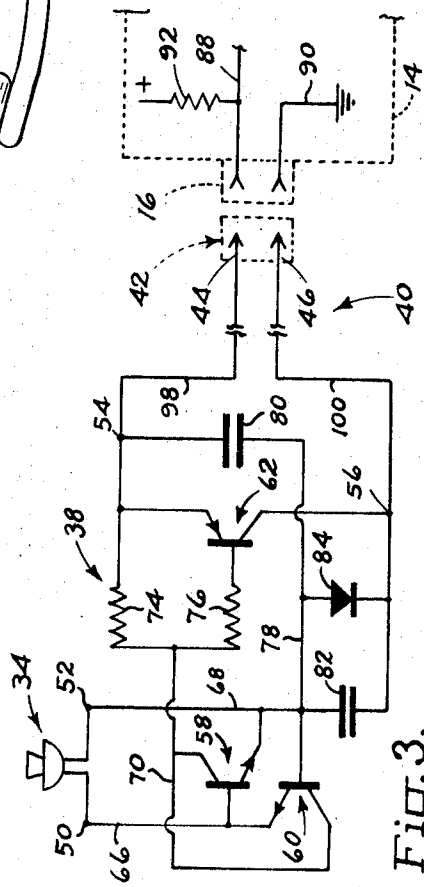


Fig. 3.

STARTER GUN ATTACHMENT

This invention relates to apparatus for controlling an electrically operated device in response to the firing of a gun remote from the device.

In events such as foot races and swimming races, the firing of a starter gun is used to signal the start of the race. Electronic timers are now used in many such events to time the events. To produce accurate timing of the event the timer should be actuated simultaneously with firing of the gun.

A general object of the invention is to provide novel sound actuated apparatus for operatively interconnecting a starter gun and an electrically operated device remote from the gun in such a manner as to actuate the device simultaneously with firing of the gun.

More specifically, an object is to provide such novel apparatus which includes a microphone which may be detachably secured to a starter gun for detecting the sound of the firing of the gun, an electrical circuit connected to the microphone for producing a signal when the microphone detects the sound of the gun being fired, and an elongated flexible conductor for connecting the circuit to such an electrically operated device for transmitting the signal to the device. With such construction the starter gun may be positioned some distance from an electrically operated device, e.g. an electronic timer, and still produce actuation of the device substantially simultaneously with firing of the gun.

Yet another object is to produce such novel sound actuated apparatus which is easily connected to and disconnected from the gun. This is accomplished by providing a magnet for securing the microphone to the gun.

In long swimming races and other types of races requiring the participants to complete multiple laps of a pool or a track, it is often necessary for the starter to take the starter gun to another art of the pool, or track area, and fire the gun at the beginning of the last, or gun, lap to notify the participants that it is the last lap. Since the starter gun need not actuate the timer at the signalling of the gun lap it need not be connected to the timer.

Another object then is to provide novel sound actuated apparatus for connecting a starter gun to an electrically operated device, which apparatus is easily connected to and disconnected from the gun and device and is portable, whereby it may be carried easily by the starter as he moves from place-to-place in a contest area.

These and other objects and advantages will become more fully apparent as the following description is read in conjunction with the drawings, wherein:

FIG. 1 is a side elevation view of sound actuated apparatus according to the invention secured to a starter gun;

FIG. 2 is a view taken along the line 2—2 in FIG. 1; and

FIG. 3 is a schematic diagram of an electrical circuit in the apparatus.

Referring now to the drawings, and first specifically to FIG. 1, a starter gun **10** having an elongated barrel **12** is illustrated in dot-dash outline. Such gun has conventional firing mechanism, however it is constructed to fire only blank cartridges. Barrel **12** has no bore extending therethrough. At **14** is indicated a portion of an electronic timer, also referred to herein as an electrically operated device, having a jack **16** into which an electrical plug may be inserted.

At **20** is indicated generally apparatus constructed according to the invention. The apparatus includes a housing **22**, which may be molded of material such as polyurethane. An elongated aperture **26**, which has a substantially keyhole shape as viewed from an end, as seen in FIG. **2**, is formed in housing **22**. The aperture receives the muzzle of the gun barrel as shown in FIG. **1**. Secured within housing **22**, at the inner end of aperture **26**, is a magnet **30** positioned to contact the barrel of the gun in the aperture. The magnet detachably holds the housing on the gun barrel.

Also secured within housing **22** are a microphone **34** and a circuit mounting board indicated generally at **36**. The microphone is positioned in the housing to face generally in the direction of the gun when the housing is mounted on the barrel of he gun. An electric circuit **38** on board **36** is shown schematically in FIG. **3**, and will be described in greater detail below.

An elongated, flexible, two-conductor cable **40** is secured adjacent one of its ends to housing **22** and has a plug **42** secured to its other end. Plug **42** has a center stem portion **44** and an outer stem portion **46** which are electrically insulated from each other. One conductor within cable **40** is connected to one of the stem portions and the other conductor within the cable is connected to the other stem portion. The stem portions of plug **42** are adapted to be inserted in jack **16** in the timer for detachably and operatively connecting the cable to the timer.

Referring now to FIG. **3**, circuit **38** includes a pair of input terminals **50, 52** and a pair of output terminals **54, 56**. Microphone **34**, as illustrated schematically in FIG. **3**, has output terminals connected to input terminals **50, 52.**

The circuit includes three transistors **58, 60,** and **62.** Referring to transistor **58,** its base is connected through a conductor **66** to terminal **50,** and its emitter is connected through a conductor **68** to terminal **52.** The collector of transistor **58** is connected to a conductor **70,** one end of which is connected to the collector of transistor **60.** The opposite end of conductor **70** is connected through a resistor **74** to output terminal **54** and through a resistor **76** to the base of transistor **62.**

The emitter of transistor **60** is connected, through conductor **66** to terminal **50.** The base of transistor **60** is connected through conductor **68,** to input terminal **52,** and through a conductor **78** and a capacitor **80** to terminal output **54.** Conductor **78** is connected to output terminal **56** through a capacitor **82** and a rectifier **84** in parallel with each other.

Referring to transistor **62,** its emitter is connected to output terminal **54** and its collector is connected to output terminal **56.**

Referring still to FIG. **3,** shown at **88, 90** inside of timer **14** are conductors which are connected to the usual two terminals of jack **16.** Conductor **88** is connected through a resistor **92** to a suitable source of positive inside the timer, and conductor **90** is grounded. At **98, 100** are illustrated the two conductors of cable **40.** The left ends of conductors **98, 100** in FIG. **3** are connected to output terminals **54, 56** of circuit **38,** respectively. The right ends of the conductors are connected to the stem portions **44, 46,** respectively, of plug **42.** With plug **42** inserted in jack **16,** conductive connec-

tions result between conductors **88, 98,** and between conductors **90, 100.**

Circuit **38** is so constructed that, with plug **42** inserted in jack **16** and a DC voltage supplied to the circuit, the sound of the firing of a starter gun adjacent microphone **34** will actuate the circuit to produce an electrical signal, or pulse, at terminals **54, 56.** Explaining further, the firing of a gun adjacent microphone **34** produces oscillating pulses at the output side of the microphone which alternately turn transistors **58, 60** on and off, with one of the transistors being on while the other is off. Turning either one of these transistors on switches transistor **62** on, which produces a negative pulse, or signal, at the output terminals of the circuit. This pulse is transmitted to and is operable to actuate the timer. The circuit is such that ambient noises generally found in the area of an event to be controlled by the starter gun will be insufficient to produce a signal which will actuate the timer.

Explaining the operation of the apparatus of the invention, housing **22** is detachably connected to the muzzle of a starter gun by inserting the muzzle of the gun in the aperture in the housing. Magnet **30** holds the housing on the barrel of the gun. Plug **42** is inserted in jack **16** of the timer. When it is desired to start a race, the starter gun is fired. The sound of such firing is detected by microphone **34,** which, in turn, actuates the electrical circuit connected thereto to produce an electrical signal, or pulse, at terminals **54, 56** of the circuit. This signal is conveyed by cable **40** to the timer, to actuate the timer.

After the timer has been actuated by the firing of the gun the plug may be removed from the timer and the housing disconnected from the barrel of the gun, whereby the gun may be used independently of the attachment. The attachment is small enough to be carried easily in a pocket or bag when it is disconnected from the gun and timer.

With the microphone, electrical circuit, and magnet being encased in polyurethane, or similar material, they are protected against rain, splashes from pools, and from damage due to jarring which might otherwise occur to such apparatus.

While a specific embodiment of the invention has been described herein, it should be apparent to those skilled in the art that variations and modifications are possible without departing from the spirit of the invention.

It is claimed and desired to secure by Letters Patent:

1. Apparatus for timing an event comprising

a gun,

an electrically operated timer remote from the gun for measuring the elapsed time of an event,

a microphone operable to sense the sound of the gun being fired,

mounting means detachably mounting said microphone on the gun, and

an electrical circuit connecting the microphone and the timer operable to produce a signal for actuating the timer when the microphone senses the firing of the gun,

said circuit including flexible conductor means extending from said mounting means to said timer.

2. The apparatus of claim **1,** wherein said mounting means comprises a magnet.

3. The apparatus of claim **1,** wherein said mounting means comprises a housing having an aperture therein for receiving the muzzle of a gun, and said microphone and said circuit are mounted within said housing.

4. The apparatus of claim **3,** wherein said mounting means further comprises a magnet secured to said housing which is positioned to contact the barrel of a gun when its muzzle is received in said aperture.

5. An attachment for a starter gun comprising

a microphone for detecting the sound of the firing of such a gun,

an electrical circuit having input and output terminals, operatively connected at its input terminals to said microphone and operable to produce an electrical signal at its output terminals when such firing is detected by the microphone,

mounting means for detachably mounting said microphone and circuit on such a gun,

elongated, flexible conductor means connected adjacent one of its ends to the output terminals of said circuit, and connecting means for operatively and detachably connecting the opposite end of said conductor means to an electrically operated timing device remote from the gun.

6. The attachment of claim **5,** wherein said mounting means comprises a magnet.

7. The attachment of claim **6,** wherein said mounting means comprises a housing having an aperture therein adapted to receive the muzzle of such a gun, said magnet is secured to said housing and is positioned to contact the barrel of a gun when its muzzle is inserted in the aperture, and said microphone and circuit are mounted in said housing.

8. An attachment for a starter gun comprising

a housing having an aperture therein adapted to receive the muzzle of a gun,

means in said aperture for detachably securing said housing to such a gun when its muzzle is inserted in the aperture,

a microphone mounted in said housing, for detecting the sound of the firing of such a gun,

an electrical circuit mounted in said housing having input and output terminals, operatively connected at its input terminals to said microphone and operable to produce an electric signal at its output terminals when such firing is detected by said microphone,

elongated, flexible conductor means connected adjacent one of its ends to the output terminals of said circuit, and

connecting means for operatively and detachably connecting the opposite end of the conductor means to an electrically operated timing device remote from said housing.

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