United States Patent

Cooper, deceased

[15] 3,646,540

[45] Feb. 29, 1972

[54] TORNADO ALARM

[72] Inventor: **Roy L. Cooper, deceased,** late of Waterman, Ill. by Alberta M. Cooper, heir

[73] Assignee: **Lynn F. Laseman,** Waterman, Ill. a part interest

[22] Filed: **Nov. 7, 1969**

[21] Appl. No.: **874,872**

[52] **U.S. Cl.** **340/241,** 178/6, 73/170

[51] **Int. Cl.** **G08b 21/00**

[58] **Field of Search** 340/241; 325/67; 178/6; 324/20; 250/226, 217

[56] **References Cited**

UNITED STATES PATENTS

3,189,780	6/1965	Takagi et al.	250/217 X
3,536,831	10/1970	Kanemaki et al.	178/DIG. 33
2,298,757	10/1942	Evans et al.	340/237 S
3,401,331	9/1968	Mussulman	324/20

OTHER PUBLICATIONS

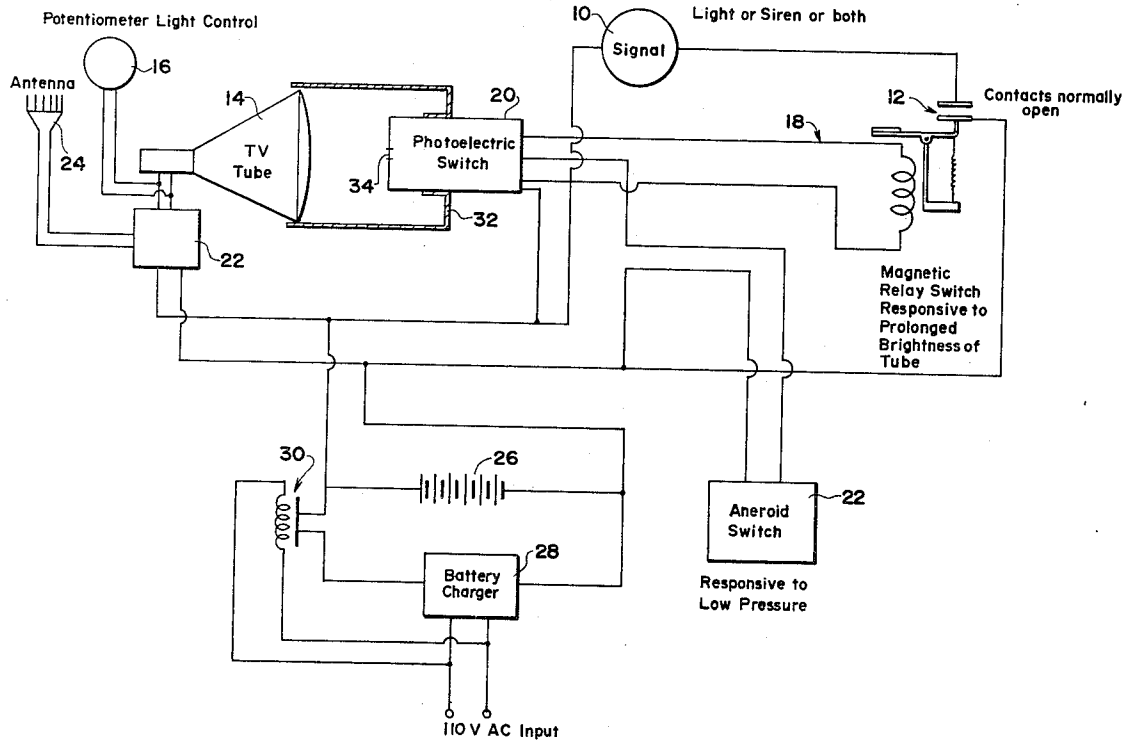
Popular Mechanics: " Now You Can See Tornados On TV" by Henry and Vera Bradshaw; March, 1969; pages 93- 96, 225, 226

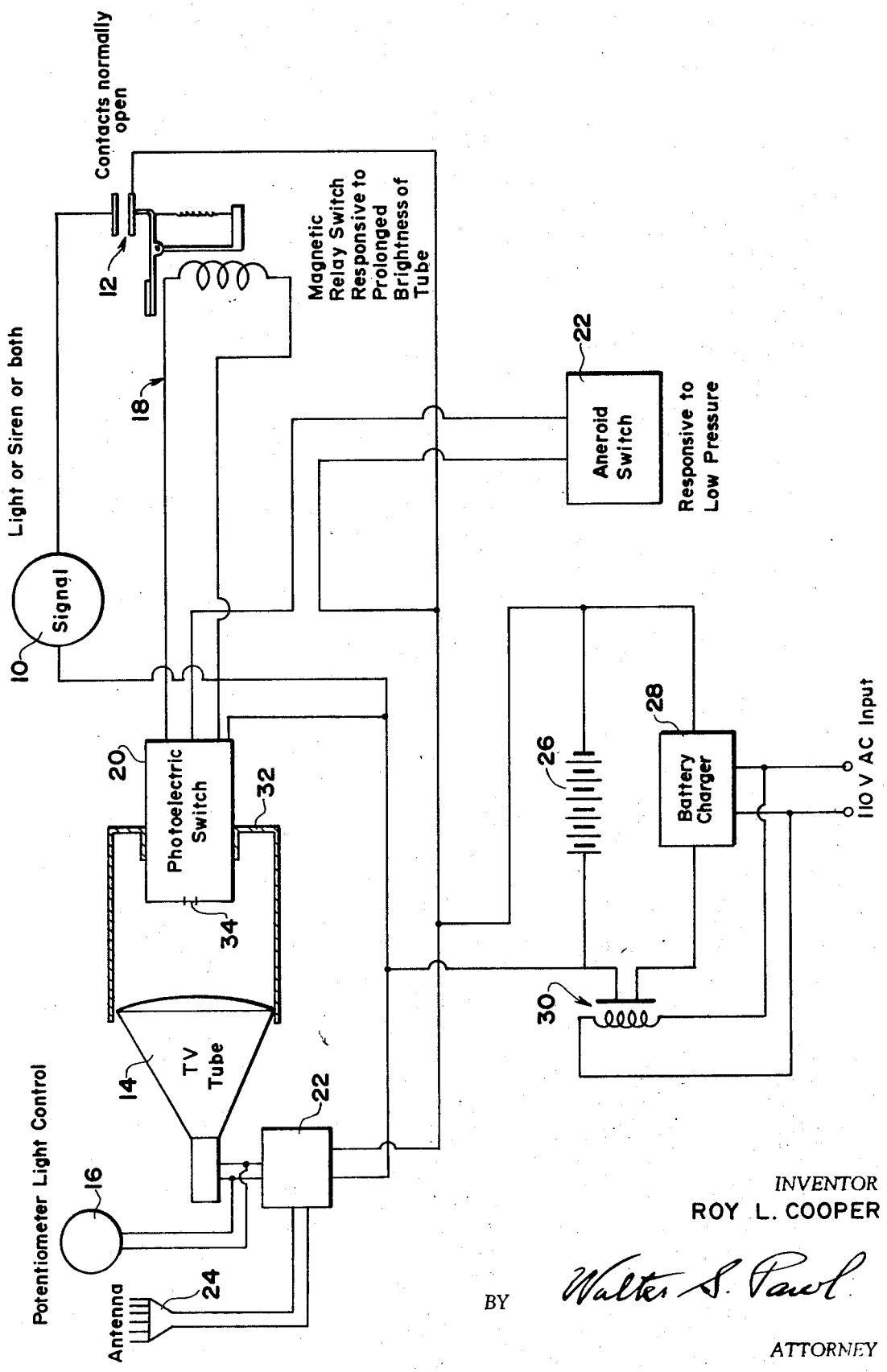
Primary Examiner—Thomas B. Habecker
Assistant Examiner—Daniel Myer
Attorney—Walter S. Pawl

[57] **ABSTRACT**

The tornado alarm consists of a simple TV-type tube circuit adapted to receive radio signals from an approaching tornado to light up the tube with a sustained brightness which is detected by an electric eye circuit to operate an alarm or warning signal of the approach of the tornado in time for taking all precautionary measures possible against loss of life or property damage. A barometric pressure switch is included in the alarm control circuit to make it operative only if the barometric pressure is substantially reduced, in order to prevent operation of the alarm should there be a local disturbance created accidentally to brighten the TV tube when there is no tornado in the vicinity.

3 Claims, 1 Drawing Figure





INVENTOR
ROY L. COOPER

BY Walter S. Paul

ATTORNEY

TORNADO ALARM

Tornado alarms, which use only the tell-tale sudden reduction in barometric pressure as a means for causing the operation of the alarm, have been found in the prior art, such as shown in U.S. Pat. No. 3,029,422. These alarms can not be relied on to distinguish a tornado from the relatively harmless storms with moderate winds. Any mild storm may produce a sudden drop in barometric pressure, depending on the speed at which the center of the storm is moving relative to the location of the alarm. Furthermore, in the event a tornado approached such an alarm which was electrically operated, there is the chance that the storm would knock out the power lines and the alarm would fail to provide the warning when it was mostly needed.

The main object of the present invention is to provide a dependable battery-operated warning system capable of definitely distinguishing a tornado from the less violent and more common storms, so as to avoid false alarms but assure a definite warning in every case of a tornado approach, even if it ripped out the power lines.

A further object is to provide an electrically operated alarm system which will operate even under conditions of failure of its normal power supply.

A further object is to devise a tornado warning system in which an electrically operated alarm is responsive to the bright glow on a TV-type tube screen affected by the proximity of a tornado in its approach toward the TV receiver, in time for the alarmees to take cover until the tornado passes.

A further object is to provide this alarm with an operating circuit having a normally open relay switch which will close only if a low barometric pressure is present indicating the proximity of a storm, thus to prevent operation of a false alarm in response to extraneous radio disturbances which could brighten the TV tube at times when no tornado was in the vicinity.

Other and more specific objects will appear in the following detailed description of one form of the present invention, as illustrated in the accompanying drawing, wherein:

The single FIGURE illustrates diagrammatically the arrangement of parts and electrical circuits connected therewith in the novel tornado alarm system.

It has been observed in operating TV receivers, that the tube brightens up with a steady glow during the passing of a tornado in the vicinity of the receiver, within a radius of up to 20 miles or more. In the midwest where tornadoes are quite violent, tests were made by turning on a TV set and after warming it up, the set was switched to channel 13. This higher frequency does not normally indicate a tornado, but the brightness control was adjusted so that the screen was almost black. Then the channel selector was turned to channel 2, which is the lowest frequency band (around 55 megacycles) on a TV, and was found to be the best one for receiving a tornado signal. Lightening appeared as bright flashes or streaks, but when a tornado approached the TV tube was brightened with a continuous glow which increased in brightness as the tornado came closer and dimmed as it moved farther away. Signals were picked up from funnels 15 to 20 miles away, giving as much as 30 minutes warning. However, whenever the screen went white, there was little time to take cover and prevent injury due to property damage and flying objects. Thus used the TV receiver was found to be an excellent warning system. However, a tornado will usually rip out power lines in its path, and your TV then becomes useless.

On the other hand, a TV receiver might provide a false alarm in response to some extraneous sources of signals similar to those generated by a tornado, e.g., a passing motorist may be operating a mobile short wave transmitter, generating a signal on a resonant frequency, causing the tube to brighten into a false alarm.

The alarm system of the present invention will not respond to such exitation unless there is simultaneously present a substantially reduced barometric pressure, sufficient to indicate the proximity of a tornado.

Although it has been estimated that the wind velocity in a tornado funnel may reach as much as 500 miles per hour, the speed of travel of the destructive funnel over the surface of the earth is generally at a speed of from 5 to 20 miles per hour. The friction of this vicious whirling wind produces a continuous generation of lightning or electromagnetic flux which penetrates the atmosphere for many miles.

It has been definitely found that any TV set which is turned to channel 2 or in the 52–55 megacycle range, will be caused to light up when a tornado is in the vicinity even though the TV tube is adjusted to extremely low light intensity, almost black. This lighting up is caused by the electromagnetic influence of the tornado which may be as far as 20 miles away.

Another characteristic of every tornado is the substantial drop in atmospheric pressure. In fact the drop in pressure inside of the flue of the tornado is so great that when it passes over a house, pressure is removed from the outside and the house virtually explodes because of the substantially higher atmospheric pressure enclosed therein. In the vicinity around the tornado the pressure drop is not so great, however there is still a definite drop from average normal pressure for several miles from the tornado.

For this reason, a normally open aneroid switch, which may be adjustable, is used in the present system to guard against false alarms, since it has to be closed by a suitably low atmospheric pressure indicating the proximity of a tornado, before the alarm can be sounded or flashed, as the case may be.

In the drawing, the signal device **10**, which may be an undulating sound or light, is operated upon closure of the normally open relay switch **12** in response to energization of the photoelectric switch circuit **18** upon its detection of a bright glow on the screen of the TV-type tube **14** through the photoelectric eye **34**, when a tornado approaches to cause such bright glow. The light shield **32** prevents entrance of any external light effects that might interfere with the operation of the photoelectric switch circuit by the glow of the TV screen.

The tube **14** is lit by a 52-megacycle transistorized power unit **22** which is controlled by a potentiometer **16** to reduce the normal lighting glow of the tube to a minimum. The continuing signals from a tornado in the vicinity are received by this power unit through its antenna **24** to increase the brightness on the screen of the tube **14** to a degree that will energize switch circuit **18** provided aneroid switch **22** is closed by a low atmospheric pressure due to the approach of a tornado; this activates the photoelectric cell in the switch circuit **18** only if the low atmospheric pressure switch **22** is closed at the same time that the tube **14** is glowing brightly.

This system is powered by a battery **26** across which a battery charger is connected through a constant duty relay **30**, which is normally closed by an electromagnetic coil tapped into the 110 v. AC power supply to the battery charger **28**. When a tornado rips out the power lines, the failure of the power supply to the battery charger deenergizes the magnetic coil of the relay switch **30** and releases the switch to its normally biased open position. This, however does not disable the system, which continues to operate on the battery power alone, whereas normally the battery power would be supplemented by the AC powered battery charger circuit, which would simultaneously provide a continuous trickle charge for the battery.

Many obvious modifications in the details and arrangements of parts in this system may be made without departing from the spirit and scope of this invention.

What is claimed is:

1. A tornado alarm system comprising

a signal device,

an electrical circuit for operating said signal device and having a normally open relay switch therein,

a TV tube,

an operating circuit for said TV tube including a 52–55 mc. power unit having a potentiometer for controlling the brightness of the glow produced on the screen of the tube, said potentiometer being set to reduce said brightness to a suitable minimum,

an antenna connected to said power unit for receiving radio signals generated by a tornado so as to substantially increase the brightness on said screen,

a photoelectric switch in front of said screen,

a control circuit for activating said photoelectric switch in response to said increased brightness to close said normally open relay switch in said circuit for operating said signal device, and

a normally open aneroid switch in said control circuit responsive to a suitably reduced barometric pressure to close and energize said control circuit for activating said photoelectric switch.

2. A tornado warning alarm system comprising

an electrically operated signal device operated by a circuit having a normally open relay switch,

a TV tube operated by a 52–55 mc. power unit set to produce a minimum glow on the screen of the TV tube,

a photoelectric switch having a circuit for closing said normally open relay switch in response to a substantial increase in brightness of said screen caused by radio signals received by said power unit from a tornado in the vicinity, and

a normally open barometric pressure switch in said photoelectric switch circuit closed by low pressure incident to the proximity of said tornado to energize said photoelectric switch circuit only when a low pressure accompanies the radio signals.

3. A tornado warning alarm system comprising

an electrically operated signal device operated by a circuit having a normally open relay switch,

a TV tube operated by a 52–55 mc. power unit set to produce a minimum glow on the screen of the TV tube,

a photoelectric switch having a circuit for closing said normally open relay switch in response to a substantial increase in brightness of said screen caused by radio signals received by said power unit from a tornado in the vicinity,

said TV tube comprising a light-producing tube operated by said radio frequency power unit at low power in said 52–55 mc. range and adjusted to produce minimum brightness on the tube screen and adapted to receive said radio signals to brighten said screen,

a photoelectric eye circuit responsive to said increased brightness to close said normally open relay switch, and

an activating circuit for said electric eye circuit having a normally open aneroid switch therein responsive to a suitably low barometric pressure incident to said tornado's proximity for closing said aneroid switch to operate said activating circuit.

* * * * *