

Dec. 7, 1965

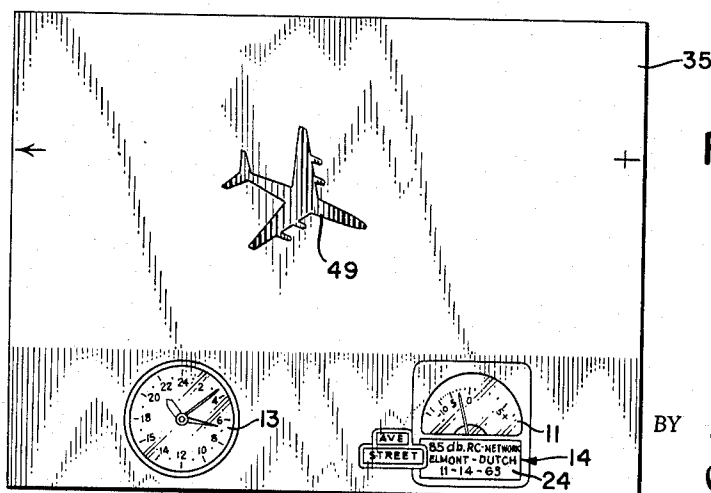
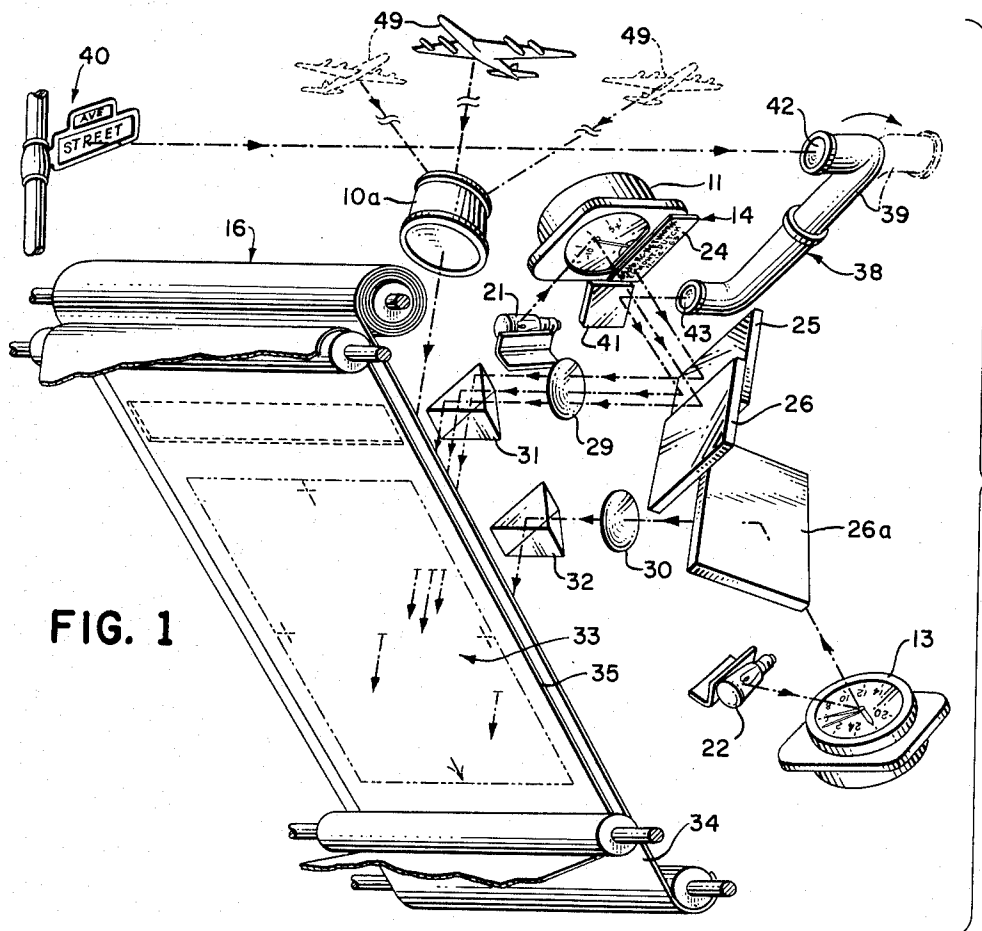
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3,222,681

TIME AND SOUND RECORDING PHOTOGRAPHIC DEVICE

Filed Jan. 22, 1964

3 Sheets-Sheet 1



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TIME AND SOUND RECORDING PHOTOGRAPHIC DEVICE

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FIG. 3

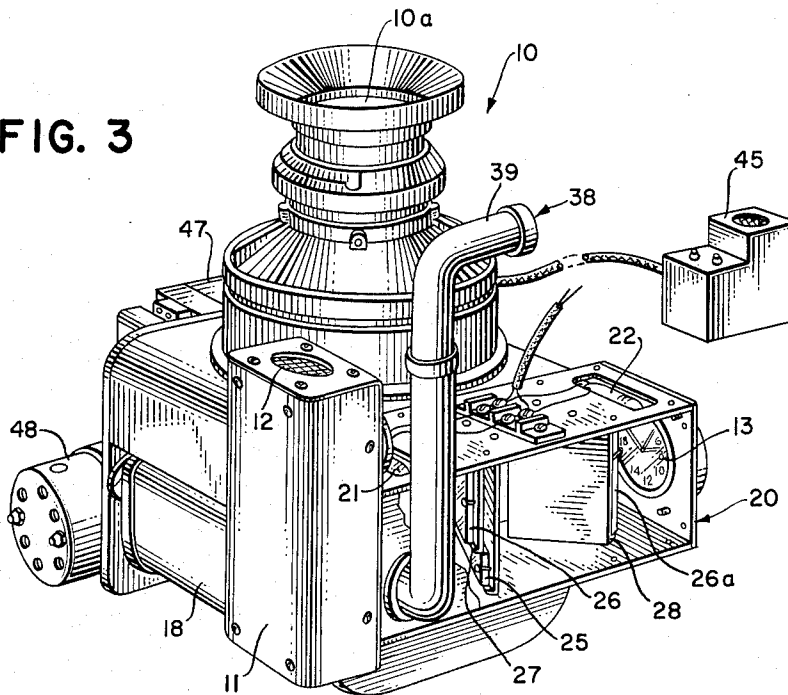
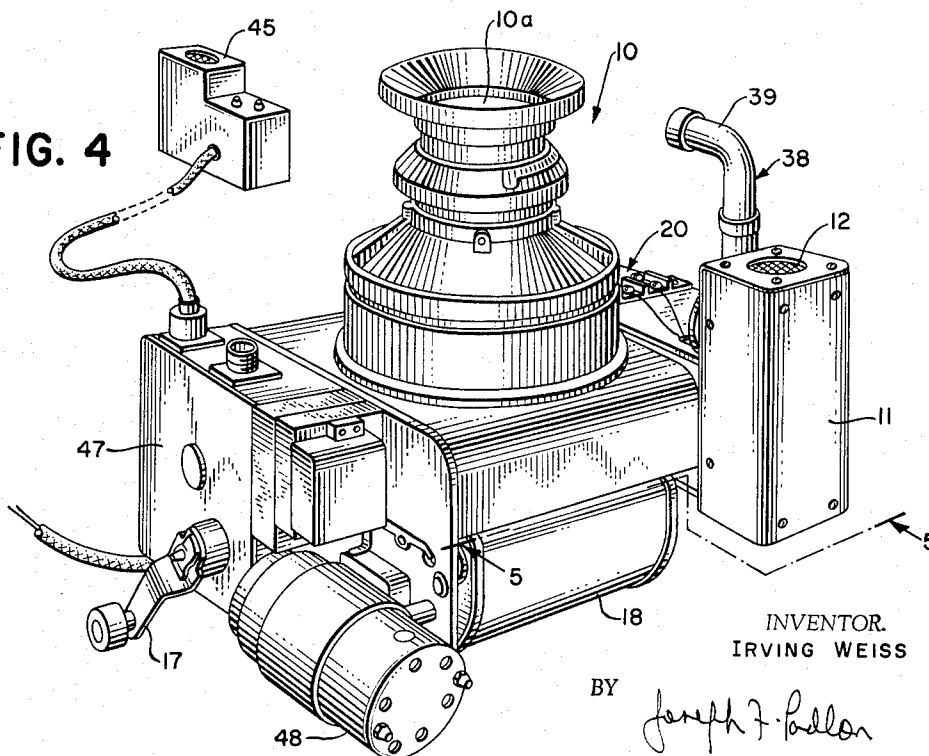


FIG. 4



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FIG. 5

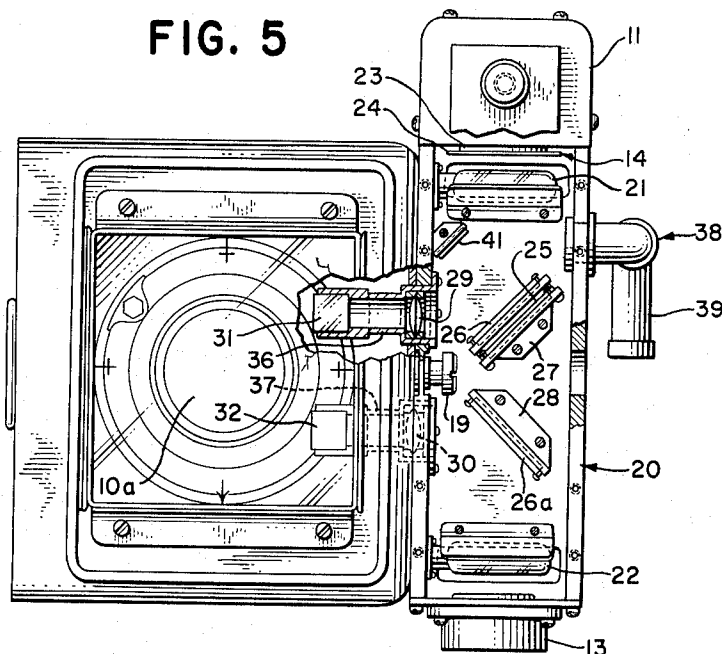
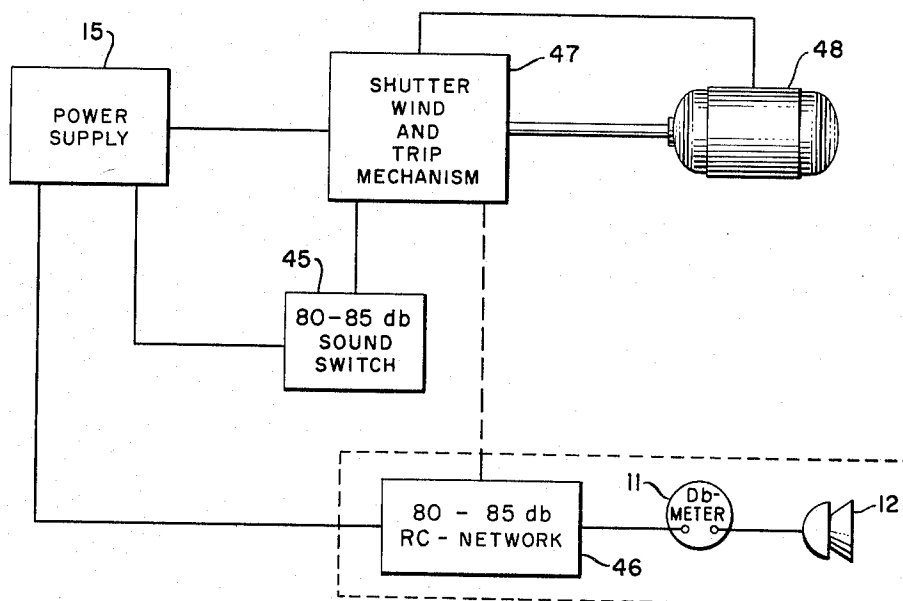


FIG. 6



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3,222,681

TIME AND SOUND RECORDING PHOTOGRAPHIC DEVICE

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7 Claims. (Cl. 346—107)

This invention relates to a device for photographing time and sound recording the approach of airplanes and the like overhead when landing or taking off. More particularly, it relates to means which are so synchronized in cooperation that it will become actuated on the approach of a vehicle whether on land or in air and which reaches a certain decibel range and initiates a sound, time, place and photographic system for purposes of recordation.

In recent years, particularly since World War II, the air travel has steadily increased throughout the world and with such speed that airport facilities have steadily lagged. The same applies with respect to safety rules and measures regarding landings and approaches to airports.

Jet aircraft with their high power engines generate considerable noise particularly on take-offs where the lift is accelerated and as a result that noise rises to a high screeching pitch or roar. Under these circumstances, communities surrounding the airport area are subject to such noises thereby making ordinary living not only uncomfortable but in many cases, unbearable.

Furthermore, approaches and landings of these jets can cause sufficient vibration to crack plaster walls and ceilings, loosen fixtures in nearby houses, break dishes in closets and oftentimes cause loosening of the building structure with danger of collapse of the building and injuries or death to the occupants of such buildings.

Under ordinary conditions, airports are installed at areas which are several miles distant from communities of homes and residences particularly in suburbs. This lessens the tensions set up by loud noises from planes. However, due to population growth and the increasing use of land with their increased value, it is inevitable that residences will be built near airports wherever possible. As a result, after a community is established, complaints about noises from airplanes and jets become more frequent and louder. As a result attempts are made to force airlines to reduce the noises emanating from jets or airplanes. In order to keep checks and records of planes causing excessive noises, various devices have been utilized.

In accordance with my invention, it is an object thereof to provide a device having a combination of synchronized cooperating components which will simultaneously make recordings of time, noise loudness, and photographs of planes and locations in order to keep records thereof.

Another object of my invention is to provide a device for recording data by means of instrumentation to study and improve approach and power control of aircraft without loss of efficiency thereof.

Another object of my invention is to provide a novel photographic device which is adapted to synchronously and simultaneously record the time, area, noise factor and identity of approaching automotive body whether in the air or on the ground.

Still another object of the present invention is to provide a novel device for time and sound recording and photographing a moving body.

Other objects and features of the invention will become apparent from the following detailed description in which:

FIG. 1. is a perspective, partly schematic view of a preferred embodiment of the invention for taking a picture of an aerial vehicle with location and recording of noise factor.

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FIG. 2 is a view of a picture taken of a plane, time and decibel reading, according to the embodiment shown in the drawings.

FIG. 3 is a perspective view of the apparatus forming the preferred embodiment of the invention herein.

FIG. 4 is a view of FIG. 3 but turned through an angle of 90°.

FIG. 5 is a sectional view taken on line 4—4 of FIG. 4, and

FIG. 6 is a plan schematic view of the circuit forming a part of the embodiment herein.

Referring now to the drawings in which like reference numerals refer to like parts throughout, it will be noted from my invention that I provide a photographic camera or unit 10; affixed to the camera by any suitable means are a decibel meter 11 and a microphone 12, a twenty-four hour aircraft or similar type of clock 13, a data plate location card 14 as shown, and the electrical connections with a power source or supply 15.

The camera 10 furthermore, with its cooperating attachments may be mounted on any suitable frame not shown, so that the camera lens 10a can be directed to any angle of elevation or azimuth so as to photograph any moving or still object of which a record is to be made as to time, location and noise or decibel recording.

The type of camera herein described is of any suitable type, such as used in aerial reconnaissance or photography. Said camera is provided with the usual type of shutter mechanism 16, such as shown in FIG. 1 and which can be manually or automatically operated when a picture is to be taken. Furthermore, a manually operable cranking mechanism 17 is provided for said shutter 16, while a removable film loaded magazine unit 18 is attached behind the lens and the shutter as shown in FIG. 4. Said magazine is provided with a spring load film roll and is attached to the rear of camera 10 by any suitable means such as a release screw 19.

Also affixed to said camera 10 is a compartment 20 which houses said decibel meter 11 and said clock 13. These are set opposite each other in said compartment 20 as shown in FIGS. 3 and 5 and are illuminated by lamps 21 and 22 of any suitable size, preferably a small tubular lamp of about 12 volts. It will be noted that underneath meter 11 there is a holding 23 for a card 24 for filling in the location where recording and picture were made.

Inside said compartment 20, and intermediate the meter and clock there are provided adjustable spaced, set reflecting mirrors, 25, 26 and 26a. These are mounted on suitable frames 27 and 28 and placed opposite the lamps so that even illumination of the clock and the decibel meter is accomplished, when a picture is taken of an airplane or other vehicle as the case may be.

Inside the compartment are short focal length lenses 20 and 30 adjusted so their line of sight extends onto 90° prisms 31 and 32 respectively onto the film plane 33 in the camera. It will be noted that the same light system is used on the opposite sides in the compartment and in the camera to photograph the image of meter and clock onto the film when a picture is snapped. When the film shutter 34 is cranked by handle 17 or other suitable automatic means and a picture taken the focal plane shutter simultaneously exposes the instruments to film 35 as they record the plane passing over the lens.

With respect to the light system, it will also be noted that lenses 29, 30 and prisms 31 and 32 are mounted in suitable housings 36 and 37 respectively entering into the dark chamber of the camera.

In addition, the light focal system is further provided with a periscope 38 which is mounted onto compartment 20 as shown. Said periscope has a telescopic rotatable section 39 which can be rotated in any direction so as to

focus the same on a means of reference, such as a lamp post sign 40 shown in FIG. 1. Said periscope is provided with lenses 42 and 43 and prisms, not shown, so as to focus the sign onto mirror 41.

It is to be noted from the foregoing that lenses 29, 30 and prisms 31 and 32 are fixed while the mirrors 25, 26 26a and 41 are adjustable for proper reflection and photographing of decibel reading and time recording when the photograph was snapped.

In addition to the above, automatic circuits as shown in FIG. 6 are provided for operation of the decibel meter and the camera. An 80-85 decibel soundswitch 45 is provided connected to a power supply 15. Also, there is connected to the power supply an 80-85 decibel resistance and capacitance attenuation network 46 which in turn is hooked up to decibel meter 11 and microphone 12. Also connected to the power supply is a shutter wind and trip mechanism 47 which in turn is separated by a motor 48. In this connection said decibel switch is set to operate at 80-85 decibels and automatically actuate motor 48 so that the necessary pictures of an approaching noise making plane will be taken simultaneously with the time the picture is taken, as the aircraft approaches the recording area, i.e., some designated point from the airport, switch being set at 80 decibels turns on the current for the operation of the camera and starts to trip the shutter.

The camera will take three or four exposures of the aircraft overhead and when the sound drops to below 80 decibels the current is automatically cut off ready for the next aircraft approach. This cutting off conserves films and wear and tear on the camera mechanism. Suitable film magazines are provided which hold considerable length.

The camera is maintained in a fixed position and may be operated by remote controls. One or more such devices may be used. Also the sound camera may be equipped with infra red film so that it can be used also at night.

In the operation of the invention the camera is swivelly mounted on any suitable framework, not shown. The angle at which the camera is mounted will depend on several factors, some of which are: first, the direction of approach of planes or their direction of ascent from an airport; and second, the noise factor which will determine the setting of the decibel meter which in turn will set off the operation of the motor for taking the picture of the approaching plane and at the same time the decibel meter reading and the time recording on the clock in compartment 20.

It is to be noted that lamps 21 and 22 are always on so that the compartment is lighted to permit simultaneous recording of the decibel reading and the time with the taking of the photograph of the airplane actuating the decibel meter.

If the camera is in a fixed position, remote controls and indicators are designed so that a group of cameras placed at different intervals and positions in relation to the airport runways and approaches to and from the landing field. Also, the camera position in relation to the airport such as distance from touchdown and center line of the plane's glide path is extremely important to the interpreters of the negative. There are two ways this is done in the camera instrument section:

(a) A card with the names of two cross roads or streets and the date is placed in position next to the decibel recording meter face so that both are inseparable on the negative.

(b) The second system is the provision of the periscope device as shown in the drawings, so as to photograph a land marker or cross road or street corner sign which through the same mirror or folded optical system records the image on the film in the instrument area.

In addition the sound camera can be provided with infra red film for night use. Also another important

feature of the invention is that the camera during daytime use can pick up the exhaust smoke being exhausted from the plane. This amount of smoke shown on the resultant photograph can be indicative of whether action is to be taken by the local boards of health for violation of air pollution ordinances.

The formula for determining height of aircraft involved in emitting or creating excessive noise on landings or take-offs, primarily of jet aircraft is given by the following formula for determining altitude by photographs taken from aircraft. However, this formula can be used for determining the altitude or height of aircraft from a point on the ground in the same instance the excessive sound is recording. The following:

(1) Focal length of camera used—7" focal length of camera must be fixed.

(2) Distance between any two points on aircraft being recorded, i.e., wingspan tip to tip—in inches.

(3) Size of image on film in inches or fraction of an inch.

Assuming the image size on the film varies from 1/2" in length to 2 inches, first one must get the scale for each image length.

$$\text{Scale} = \frac{\text{image size on film}}{\text{wing span}' \times 12}$$

Image size

$$1/2'' \text{ Scale} = \frac{1/2}{140' \times 12} = \frac{1}{335}$$

Altitude

$$= \frac{7''}{Y335} = \frac{23450''}{12} = 1954 \text{ feet}$$

$$3/4'' = \frac{.75}{140' \times 12} = \frac{.75}{1680} = \frac{7''}{2240} = 1306 \text{ feet}$$

$$1'' = \frac{1}{140 \times 12} = \frac{1}{1680} = \frac{7}{1680} = \frac{11760}{12} = 980 \text{ feet}$$

and so on

$$1 1/4'' = 775.33 \text{ feet}$$

$$1 1/2'' = 653.3 \text{ feet}$$

$$1 3/4'' = 563.3 \text{ feet}$$

$$2 \text{ inches} = 490 \text{ feet}$$

$$\frac{2}{140 \times 12} = \frac{2}{1680} = \frac{1}{840} \times 7'' = \frac{5880}{12} = 490 \text{ feet}$$

It will be noted from the foregoing that I have provided apparatus which will automatically and effectively operate in recording time, noise and flight of an airplane 49 which because of its noise factor will cause operation of the decibel meter and the photograph unit. The records so obtained will then be made available to the local anti-noise authorities for proper action.

While a preferred embodiment of my invention has been illustrated and described, it is to be understood that various modifications may be made without departing from the spirit and scope of the invention as claimed.

I claim:

1. Apparatus for automatically photographing, sound and time recording a noise making moving object comprising a camera, a decibel recording means in connection with the camera, microphone means in connection with said decibel recording means, a time piece in connection with the camera, an optical system for said recording means and time piece, extending into the camera, said system comprising a plurality of lenses and prisms, a light system for said decibel unit and time piece, said light system being adapted to illuminate the decibel meter and the time piece, electrical circuit control means for said decibel unit and time piece, synchronous electrical connections for the camera and decibel unit adapted to actuate the camera to take the necessary photograph while simultaneously recording the sound and time.

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2. Apparatus for automatically photographing, sound and time recording an airplane comprising a camera, decibel recording means in connection with said camera, microphone and switch means in electrical connection with said decibel recording means, a time piece in connection with said camera, an optical light system for said recording unit and time piece, extending into the camera, said system comprising a plurality of lenses and prisms for transmitting the image of the time piece and the decibel recording means to a film in the camera, a light system for said decibel unit and time piece, said light system being adapted to illuminate the decibel recording means and the time piece, electrical circuit control means for said decibel means and time piece, synchronous electrical connections for the camera and decibel unit adapted to actuate the camera to take the necessary photographs.

3. Apparatus for automatically photographing sound and time recording an airplane in flight comprising a camera, decibel switch operable recording means in connection with the camera, a decibel meter, microphone means in connection with said decibel recording means, a time piece in connection with the camera, optical means for said recording means and time piece, extending into the camera and synchronized with the operation of the camera, said system comprising a plurality of mirrors, lenses and prisms set in light alignment from the outside to the interior of the camera, a light system for said decibel means and time piece, said light system being adapted to illuminate said decibel meter and the time piece, an electrical circuit control for the camera and synchronous by operable electrical circuit for said camera and decibel unit adapted to actuate the camera to take the necessary photograph.

4. A device for automatically photographing, sound and time recording an airplane in flight comprising a camera having an operable speed shutter, a film magazine in connection with the camera, a sound switch, a decibel recording unit in electrical connection with the switch and the camera, a meter unit in connection with the switch adapted to actuate operation of the camera when an outside noise of the airplane reaches a minimal decibel recording, a time piece in electrical connection with the camera, an optical system for said recording unit and time piece, extending into the camera, said system comprising a pair of lenses and prisms, a light system for said decibel unit and time piece, electrical circuit control

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means for sound switch, decibel unit and time piece, a power supply, and electrical circuit connections from said supply for said camera, decibel unit, time piece adapted to actuate the camera to take the necessary photograph, said switch means being adapted to shut off the operation of the decibel unit and camera when the decibel reading is below the minimum set for the operation of the camera.

5. A device according to claim 4 in which the decibel recording unit and time piece are confined in a compartment, said compartment having reflector means, and leads into the camera for the prisms and lenses.

6. A device for automatically photographing, sound and time recording a moving noise making object comprising a camera having an automatically operated shutter, a shutter wind and trip mechanism, and a film magazine in connection with said camera, a sound switch, a sound recording unit in electrical connection with said camera, said sound recording unit having a meter adapted to actuate the operation of the switch when an outside noise reaches a minimal decibel recording, a time piece in connection with the camera, a plurality of lenses and prisms, a light system for the lenses, prisms for said decibel unit and time piece, a power supply source, electrical circuit control means for said decibel unit and time piece, synchronous electrical connections for the camera and decibel unit adapted to actuate the camera to take the necessary photograph, and means adapted to shut off the operation of the decibel unit and camera when the decibel reading is below the minimum set for the operation of the camera.

7. A device according to claim 6 where the electrical circuit is in connection with a power supply, a motor, said shutter wind and trip mechanism, the sound switch, and a resistance and capacitance attenuation network.

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