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INSTRUMENT FOR INDICATING THE POSITION  
OF THE VARIOUS CONTROL ELEMENTS  
OF AN AIRPLANE  
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FIG. 1.

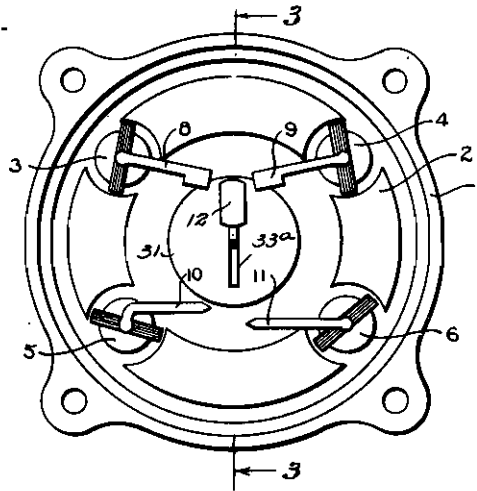


FIG. 2.

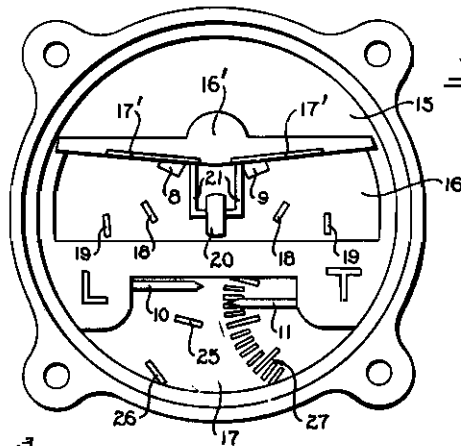
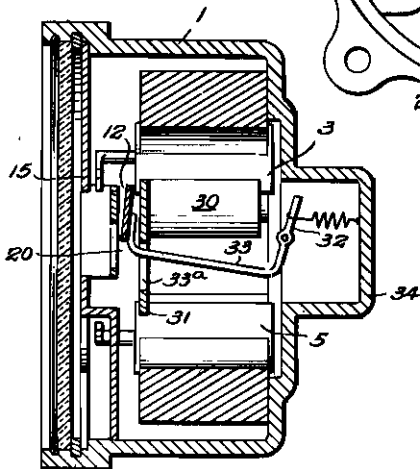


FIG. 3.



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## INSTRUMENT FOR INDICATING THE POSITION OF THE VARIOUS CONTROL ELEMENTS OF AN AIRPLANE

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This invention relates to indicating instruments and more particularly to an instrument for indicating the position of the various control elements of an airplane.

An object of the invention is to provide an instrument for visually indicating the position of the various airplane control elements.

A further object is to provide an instrument which visually indicates the position of the landing wheels, tail skid, landing flaps, trimming mechanism and the like to show when these elements are in flight position or in landing position.

Another object is to provide a simple and dependable instrument of the above type in which the various pointers are in convenient and readily observable positions.

Another object is to provide a device of the above type having novel and improved details of construction and combinations of parts.

Various other objects and advantages will be apparent as the nature of the invention is more fully set forth.

Although the novel features which are believed to be characteristic of this invention will be more particularly pointed out in the claims appended hereto, the invention itself will be better understood by referring to the following description, taken in connection with the accompanying drawing forming a part thereof, in which a specific embodiment of the invention has been set forth for purposes of illustration.

In the drawing,

Fig. 1 is a plan view of an instrument with the cover removed to show the pointer arrangement and operating mechanism; and,

Fig. 2 is a front plan view of the complete instrument.

In the following description and in the claims, certain specific terms are used for convenience in referring to various details of the invention. These terms, however, are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawing more in detail, the instrument is shown as comprising a housing 1 having an annular magnetic system 2 provided with gaps in which are disposed the actuating coils 3 to 6 of the indicating instruments to be described. The actuating coils 3 and 4 are provided with pointers 8 and 9, respectively, which are of the general shape of the aircraft landing gear with the wheels attached thereto. These pointers are arranged to extend substantially horizontally when the landing gear is in flight

position and to extend vertically when the landing gear is in position for landing.

The actuating coils 5 and 6 are provided with pointers 10 and 11, respectively, which are adapted to indicate the position of other control members such as the landing flaps and the trimming mechanism, as will be described.

An additional indicator 12 may be positioned at the center of the instrument and may be arranged to drop vertically from the position shown in Fig. 1 when the electromagnetic system is energized.

As shown in Fig. 2, the instrument is provided with a cover 15 having an upper opening 16 and a lower opening 17, which openings may be covered by suitable transparent material, such as glass.

On the cover 15, a figure of an aircraft is depicted as at 18'. The lower portion 17' of the wings of this figure may be made of luminous materials. The position of this figure is such that when the pointers 8 and 9 are retracted, the lower edges thereof, representing the landing wheels, barely show below the luminous edges 17' of the wings. When the landing wheels are moved to landing position, the pointers drop to the position indicated by index marks 19. When the landing wheels have been locked in this position, as by actuation of the usual pawl mechanism, the pointers 8 and 9 are further moved to the final position indicated by the index marks 19. When in this position, the pilot knows that the wheels are locked in proper position for landing.

The cover 15 may also have an aperture 20 formed therein, in a position corresponding to the lower position of the indicator 12. This opening may be connected to the image of the plane by designating marks 21. The indicator 12 is connected to suitable repeating mechanism for indicating the position of the tail skid and is retracted as shown in Fig. 1 when the tail skid is in flight position, but drops into registration with the opening 20 of the cover 15 when the tail skid is lowered into landing position.

It is to be understood that the moving coils 3 to 6 may be connected to suitable electrical repeaters, such as electrical resistance transmitters or the like, which may constitute differential instruments, such as crossed-coil measuring instruments. Such repeating mechanisms are well known in the art and are, accordingly, not set forth in detail herein. It is to be understood, however, that the repeating device is so connected that the movement of the pointers represents the mechanical movement of the corresponding

parts of the plane. The pointers are preferably spring loaded in such a way that, upon failure of the electrical circuits, they are retracted to their normal flight position or entirely disappear behind the cover 15 of the instrument.

The pointer 10 is controlled in accordance with the position of the landing flaps by means of an electrical repeater mechanism of the type above mentioned. This pointer may be arranged to extend horizontally when the landing flaps are in position of flight and may extend vertically when the flap is in landing position. Suitable index marks 25 and 26 may be provided to designate the different positions of the pointer 10. The index mark 26 may, for example, designate the landing position and the index mark 25 may designate the starting position of the flaps.

Pointer 11 may be controlled by members serving to regulate the trimming of the airplane and may also be designed to extend horizontally when the trimming mechanism is in normal flight position and may move downwardly to indicate the landing position thereof. Suitable index marks 27 may be used to designate the various positions of this pointer.

The arrangement of the pointers shown in the drawing represents a preferred embodiment of the invention. It is to be understood, however, that this arrangement may be varied in accord-

ance with the requirements of any particular case. For example, the pointer 11 may be used, if desired, in place of indicator 12 to designate the position of the tail skid. If a more conspicuous indication of the tail skid motion is desired, pointer 11 may be attached to a flag which moves in front of the opening 20 to show the gradual sinking of the tail skid.

It will be noted that the above-described instrument provides a means for readily indicating to the pilot the respective positions of the various parts. The arrangement is such that the indications are shown in connection with the image of a plane so that the possibility of error in reading the device is reduced to a minimum.

In the embodiment shown, the various pointers are arranged to stand perpendicular when the parts are in landing position and to rest horizontally when the parts are in flight position. The pointers 8 and 9, representing the position of the landing wheels, only move to their final position when the landing gear mechanism is properly locked; consequently, if these pointers should only reach a position indicated by the index marks 18, the pilot would know that, although the landing gear was in position for landing, it had not yet been locked.

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