

April 25, 1933.

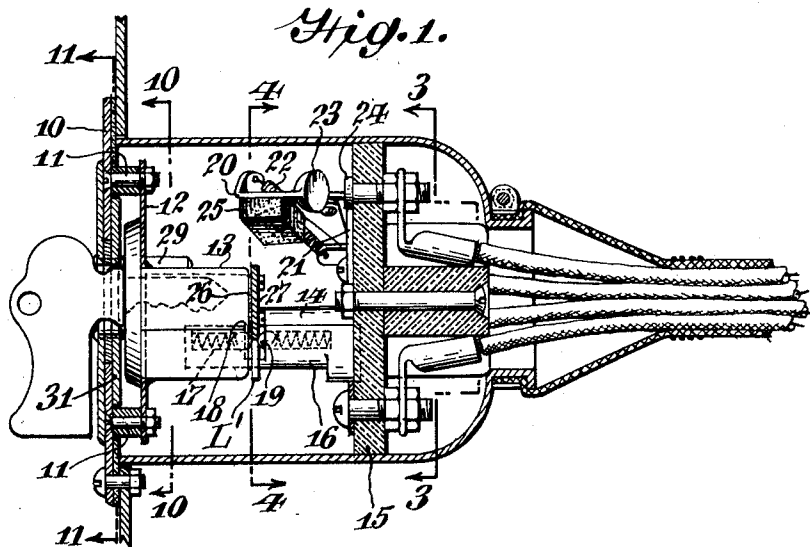
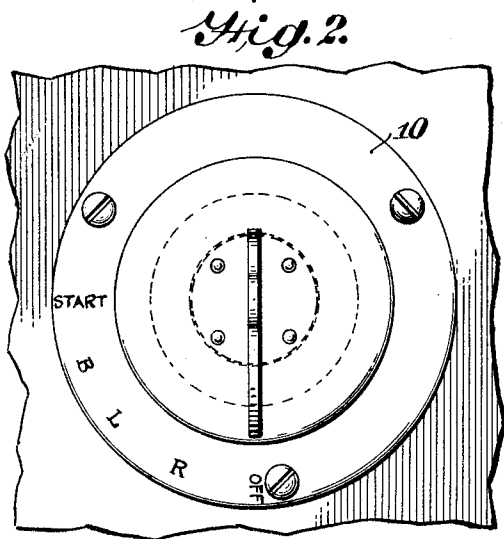
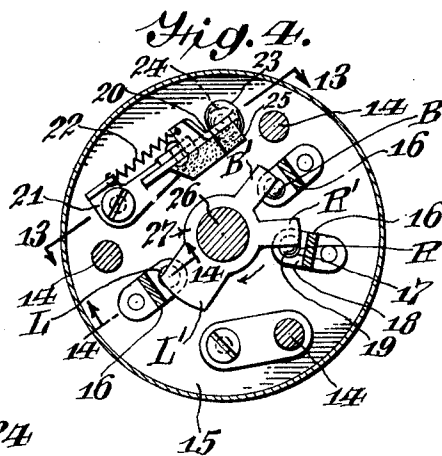
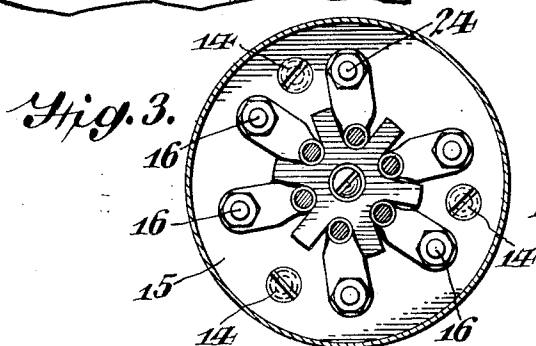
M. ZUGERMAYER

1,906,121

SAFETY MAGNETO SWITCH

Filed Aug. 18, 1931

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

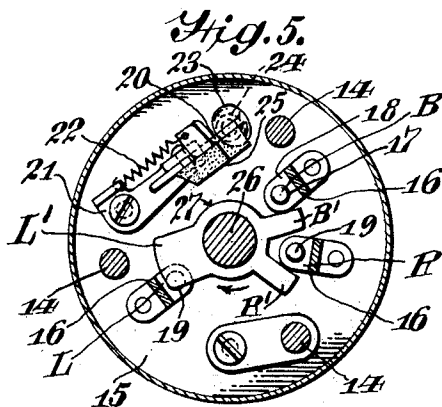
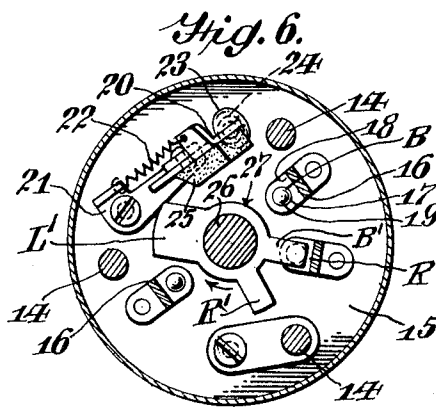
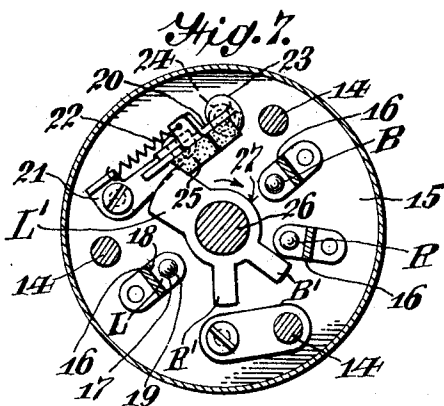
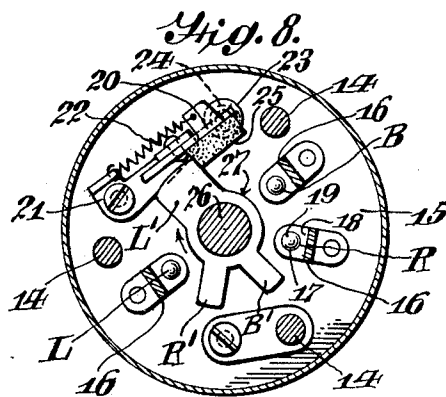
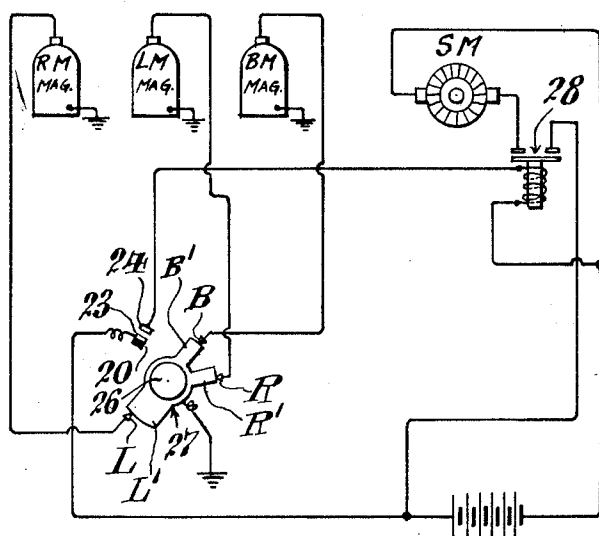


Fig. 9.

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3 Sheets-Sheet 3

Fig. 10.

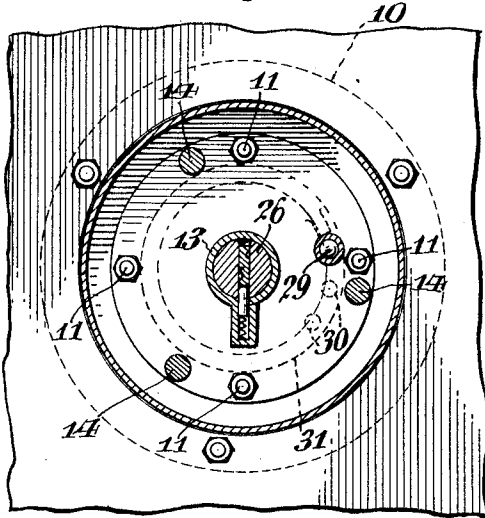


Fig. 11.

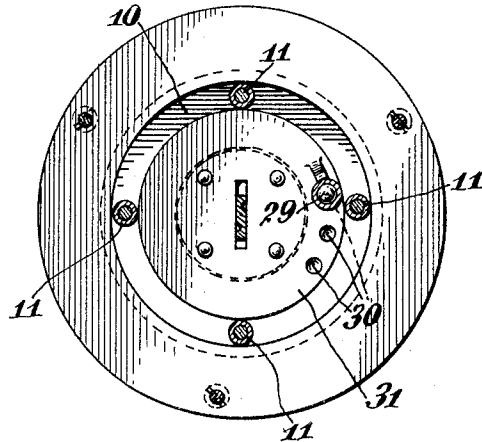
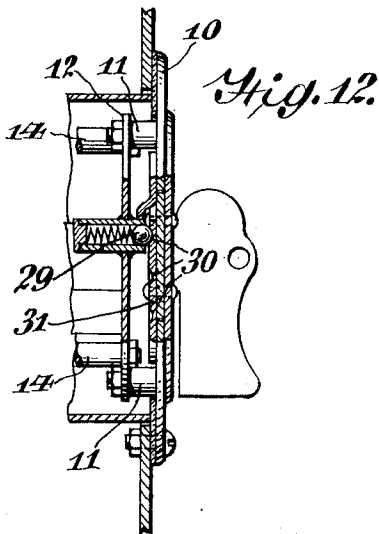


Fig. 13.

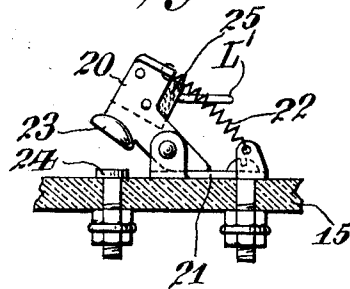
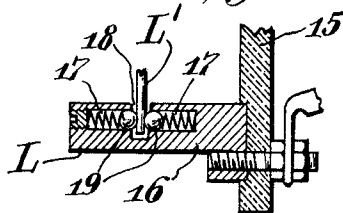


Fig. 14.



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UNITED STATES PATENT OFFICE

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SAFETY MAGNETO SWITCH

Application filed August 18, 1931. Serial No. 557,917.

This invention relates to airplane switches and more particularly to a switch mechanism for use in conjunction with airplanes in controlling the starting of the engine and tilting of the magneto system and the operation of the same. An important object of the invention is the provision in a switch of this character of a construction such that these features may be embodied in a switch without danger of accidental operation of the starter when a key controlling the operation of the switch is removed.

A further object of the invention is a provision of a switch of this character affording locking for the ignition circuits of the airplane engine. A still further object of the invention is to provide a novel switch construction assuring positive control of the associated circuits. A still further object of the invention is the provision of a switch of this character which may be very lightly and at the same time durably constructed so that it may be practically employed in airplanes.

It is to be understood that the particulars herein given are in no way limitative, and that while still keeping within the scope of the invention, any desired modification of details and proportions may be made in the construction of the appliance according to circumstances.

The invention comprises further features and combination of parts to be hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a sectional view through the switch.

Figure 2 is a front elevation thereof.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a section on line 4—4 of Figure 1, showing the parts of the switch in position.

Figures 5, 6, 7 and 8 are views similar to that of Figure 4 but illustrating respectively the switch in the right magneto, left magneto, "booster" and starting positions.

Figure 9 is a wiring diagram showing the manner in which a switch is connected.

Figure 10 is a section on line 10—10 of Figure 1.

Figure 11 is a section on line 11—11 of Figure 1.

Figure 12 is a detail sectional view showing the positioning means for the switch.

Figure 13 is a detail view showing the sub switch controlling the starting and Figure 14 is a detail sectional view through one of the contact posts.

Referring to the drawings the numeral 10 generally designates the front plate of the switch having secured thereto as at 11 a lock plate 12 supporting a tumbler lock 13 of any suitable description. From the plate 12 which is electrically connected with the lock 13 by means of metallic posts 14 an insulating plate 15 is spaced and supported. Extending from the plate 15 toward the plate 12 is a plurality of contact posts 16 more clearly shown in Figure 14.

As shown in these figures each contact post has formed therein a longitudinal bore 17 which is centrally intercepted by a transverse slot 18 and which has disposed therein at opposite sides of this slot spring pressed contact elements 19, at present shown in balls. These contact balls in the absence of interposition of a switch blade as character described normally engage with one another.

Each post 16 is electrically connected with a binding post arranged at opposite sides of the plate 15 and adapted for connection with a lead wire. At present there are three of the posts 16 illustrated providing contacts hereinafter referred to as contacts R L and B respectively. One of the separating and supporting posts 14 is electrically connected by a further binding post which is in turn connected with a ground wire. Likewise mounted upon the insulating base is a switch structure more clearly shown in Figure 13. This switch structure comprises a pivotal contact element 20 in the form of a lever, one end of which is normally maintained in engagement with a fixed base plate 21 by means of a spring 22 engaged with the lever, the opposite end of which has a contact point 23 which as the lever is swung and brought into engagement with a stationary contact element 24, carried by the insulating base the lever forming the pivotal contact is provided with

an insulating striker 25 for the purpose presently to appear.

Secured to the rotating part or barrel 26 of lock 13 is a contact element 27 having three arms indicated at B' R' and L' respectively. The spacing of contact posts 16 and of these arms and the relative widths of these arms is such that in one position thereof (see Figure 4) an arm is in engagement with each of the contact posts so that all of these contact posts are electrically connected with the plate or contact element 26 and through this contact element the lock plate 12 and post 14 with the ground.

In a second position (see Figure 5) the contact arms B' and R' disengage from the posts 16 with which they are associated while the contact L' maintains its engagement due to the increased width thereof.

In a third position (see Figure 6) the contact L' disengages from its associate post and the contact B' comes into engagement with the post 16 originally engaged by the contact arm R'.

In a fourth position all of the contact arms B' R' and L' are disengaged from their associate posts. At this time one of the contact arms (contact arm L' in the present instance) is engaged with the insulating piece

of the switch of Figure 13 and as a slight further movement of the contactor against the action of spring 22 will cause the switch of Figure 13 to be closed, arms B' R' and L' engaging between the balls constituting the actual contact elements of the contact posts 16 as these arms pass through the slots of the post have a double contact with the post insuring perfect grounding of a post with which any of the contact arms is aligned.

Furthermore the double back contact prevents any transverse strain being placed upon the contact arms and affords an interfrictional engagement with the arms reducing the force necessary to the operation of the switch.

In Figure 9 there is illustrated diagrammatically the connections of the switch structure just described in the magneto and starting system of an airplane engine.

In this diagram the blade element of the switch is illustrated in the position which it occupies in Figure 4 and it will be noted that in this position each of the magnetos RM, LM and BM is ground so that no current is supplied for operation of the engine (not herein illustrated). By a shift to the position of Figure 6 the right magneto RM is grounded while the booster and left magnetos BM and LM are placed in operation.

A shift to the position of Figure 5 grounds the magneto LM and places the magnetos BM and RM in operation. In the position of Figure 7 all of the magnetos are in operation as they are likewise in the position of Figure 8 at which time the circuit of switch 20 is closed thereby through the usual electro-

magnetic switch 28 closing the circuit of a starting motor SM. It will thus be noted that from the position of Figure 4 in which the key may be inserted or removed the key may be employed to rotate the lock barrel and thus the switch element and successively tilt the magnetos RM and LM individually and then to place these magnetos simultaneously in use if this is desired as it usually is during the starting operation. After the starting operation the switch may be readily manipulated to place either magneto RM or magneto LM in use. The switch is held in its adjusted positions through spring pressed latch mechanism 29 co-acting with sockets 30 formed in a plate 31 secured to the forward end of the lock barrel 26. A tumbler lock is preferably employed and in common with all such locks will prevent withdrawal of the key until the lock barrel and switch element are in the position illustrated in Figure 4.

It is obvious that a structure of this character provides a novel and efficient means for successively tilting a group of instruments or for placing the same in operation and it will also be obvious that this construction may be very readily and cheaply produced. Since the construction employed is capable of a considerable range of change in modification without in any manner defaulting from the spirit of the invention, it is to be understood that the invention is not to be limited except as hereinafter claimed.

I claim:

In a switch of the character described, an insulating support, a rotatable member opposing the support, a plurality of posts arising from the support and extending in surrounding relation to the rotatable member, each post having a notch and having mounted thereon spring pressed contact elements to engage a member projecting into the notch and a contact element carried by the rotatable member and including portions to extend into said notches, a normally open switch carried by said base and including an oscillating contact element, at least one of the portions of the contact of the rotatable member having insulated engagement with said oscillating contact to shift the same and thereby close said switch.

In testimony whereof I affix my signature.
MELMORE ZUGERMAYER.