April 29, 1958 M. L. MOFFITT, JR 2,832,175

TOY AIRPLANE CONSTRUCTION

Filed Dec. 28, 1955 2 Sheets-Sheet 1

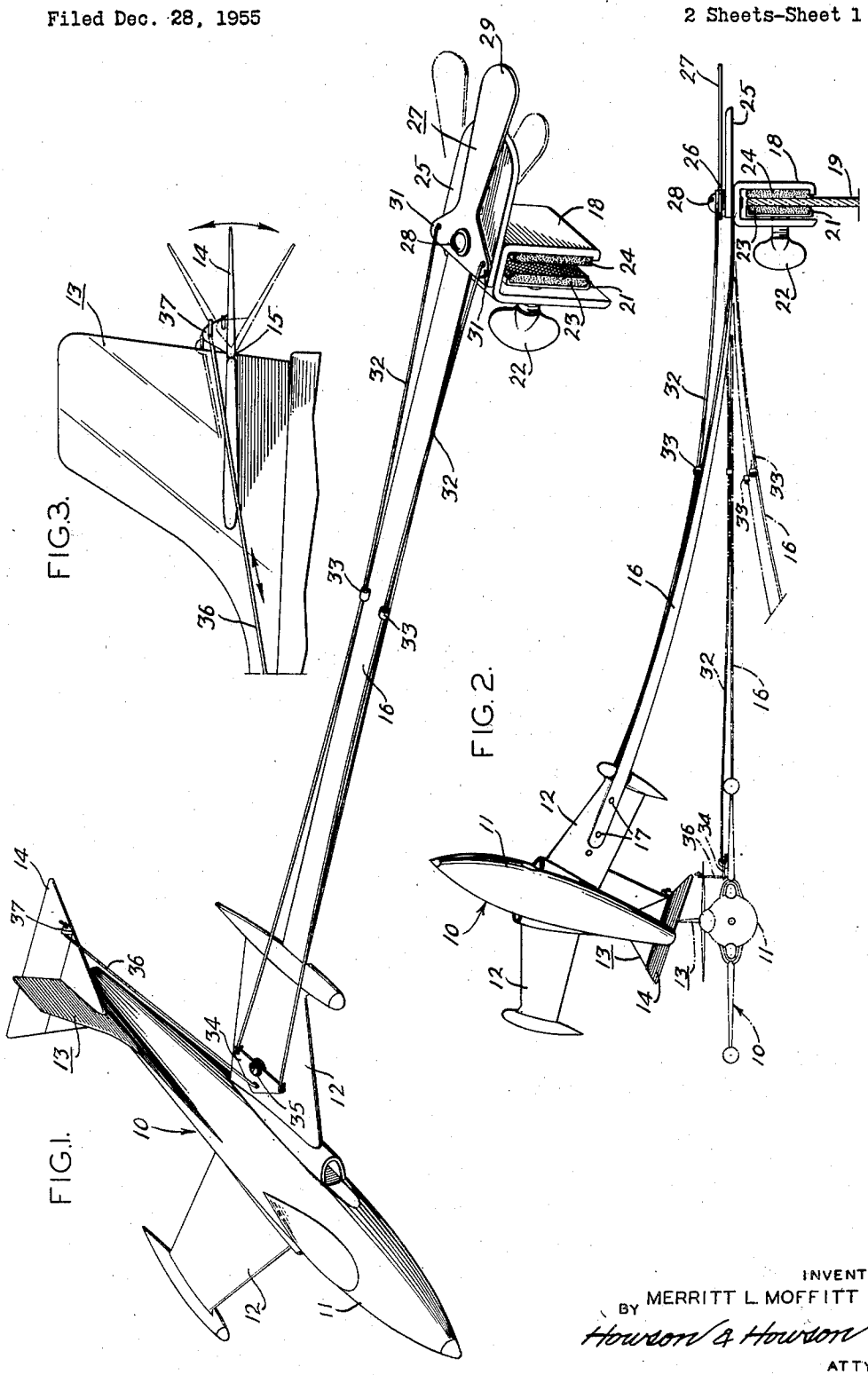


FIG. 3.

FIG. 2.

FIG. 1.

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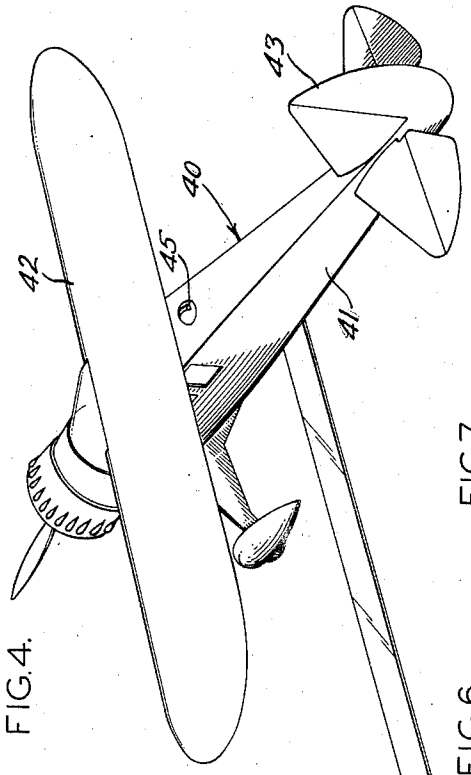


FIG. 4.

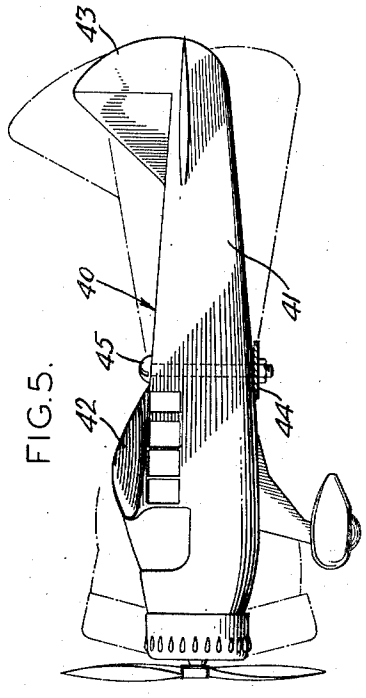


FIG. 5.

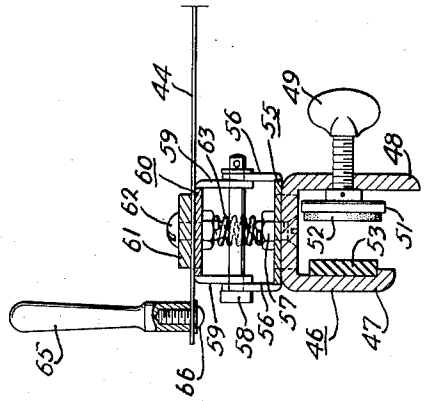


FIG. 7.

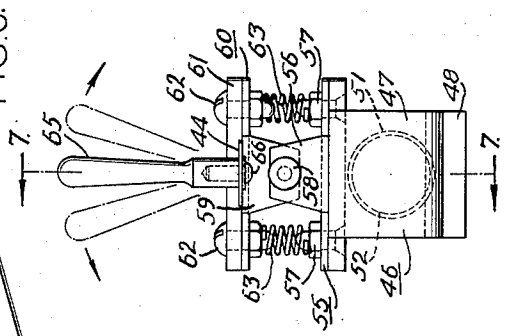
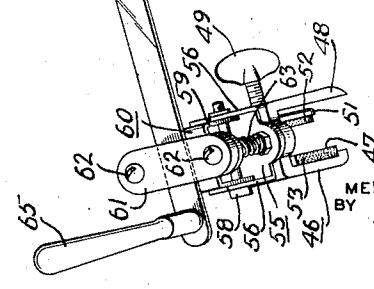


FIG. 6.



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TOY AIRPLANE CONSTRUCTION

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5 Claims. (Cl. 46—77)

The present invention relates to new and useful improvements in toy airplanes and more particularly to toy airplanes of the type adapted to be secured to the window of a moving vehicle, such as an automobile.

The principal object of the present invention is to provide a novel toy airplane which may be mounted on the window of an automobile extending outwardly from the vehicle and be controlled by apparatus within the automobile.

Another object of the present invention is to provide a novel toy airplane which may be secured outwardly of a window of a vehicle and having control apparatus within the interior of the automobile which is capable of causing the toy airplane to dive or climb during forward movement of the automobile.

A further object of the present invention is to provide a novel toy airplane which is mounted at one end of a flexible supporting arm secured to the window of the automobile extending outwardly from the automobile, and having a control lever within the vehicle which will actuate the elevator of the airplane and cause the airplane to dive or climb.

A still further object of the present invention is to provide a novel toy airplane having the features and characteristics set forth which is of rugged construction, may be manufactured easily and cheaply, and which imitates the movement of a free-flying airplane.

These and other objects of the present invention and the various features and details of the operation and construction thereof are hereinafter more fully set forth and described with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of the airplane and control mechanism of the present invention;

Fig. 2 is a front elevational view of the airplane, supporting arm and control mechanism secured to the window of a vehicle;

Fig. 3 is an enlarged fragmentary side elevational view of the tail assembly of the airplane of the present invention, illustrating the means for actuating the elevator;

Fig. 4 is a perspective view of a modified form of airplane and control apparatus of the present invention;

Fig. 5 is a side elevational view of the airplane illustrated in Fig. 4, illustrating the means for securing the airplane to the supporting arm;

Fig. 6 is an elevational view of the control apparatus for the airplane of Fig. 4; and,

Fig. 7 is a transverse sectional view taken on line 7—7, Fig. 6, illustrating the construction of the control apparatus.

Referring more specifically to the drawings, and more particularly Fig. 1 thereof, reference numeral 10 designates generally a toy airplane comprising a body or fuselage 11, wings 12, a tail assembly 13 and an elevator 14. The elevator 14 is pivotally secured to the tail assembly, as indicated at 15, and may be pivoted from a normal

horizontal position to upper and lower limit positions, shown in broken lines in Fig. 3.

The airplane 10 is mounted at the outer end of a flexible supporting arm 16 which may be easily bent or distorted up and down and may be twisted a limited amount. The supporting arm 16 consists of a narrow flat strip of spring steel or flexible plastic material and, in the embodiment of Fig. 1, has its outer end secured to the under side of the wing of the airplane, for example by means of a pair or rivets 17, 17, so that the airplane wing and supporting arm lie in substantially the same plane. If desired, however, the supporting arm may be secured in any manner to any other part of the airplane and all that is necessary is that the airplane be substantially horizontal when the supporting arm is unflexed and in a horizontal plane.

In accordance with the present invention, the inner end of the supporting arm is fixed to a bracket 18 which, in turn, may be removably secured to the window of an automobile, as shown at 19 in Fig. 2. The bracket 18 comprises an inverted U-shaped frame having positioned within the legs of the frame a movable plate 21 which is secured to the inner end of a wing-bolt 22 threaded through the outer leg of the bracket 18. The inner surface of the movable plate 21 and the inner surface of the other frame leg have, for example, felt pads 23 and 24, respectively, secured thereto which engage opposite sides of the window when the plate is moved inwardly by means of the wing-bolt to secure the bracket to the window. The bracket is mounted on the automobile window with the supporting arm in a horizontal plane with the result that when the airplane is left unattended the airplane assumes a safe level-flight position. With this construction, the airplane may be operated by small unskilled children and when the child releases the control lever, the airplane will return to the level-flight position, a feature not present in other toys of this type.

The supporting arm is fixed to the upper surface of the bracket 18 and beneath a plate 25, for example, by means of rivets 26 which extend through the plate and bracket as illustrated in Fig. 2. The plate 25 in turn projects inwardly of the automobile and provides a mounting surface for a control lever 27 which controls operation of the airplane when the automobile is moving. The control lever is pivotally mounted on a boss projecting upwardly from the surface of the plate 25 by means of a bolt 28 extending through the lever 27 and threaded into the plate 25, and the control lever comprises an actuating arm 29 projecting inwardly of the automobile and a pair of outwardly extending arms 31, 31 disposed at opposite sides of the control lever mounting means.

An important feature of the present invention is the provision of control apparatus to actuate the elevator of the airplane between its opposite limit position and cause the plane to dive or climb, as desired, when the automobile to which the plane is attached is moving. To accomplish this movement of the elevator 14 between its upper and lower limit positions, a pair of control wires 32, 32 formed, for example, of thin piano wire are secured to the opposite arms 31, 31 of the control lever and extend longitudinally of the supporting arm 16. A pair of eyelets 33, 33 secured to the mid-point of the supporting arm 16 engages the control wires 32, 32 and maintains the control wires in a position adjacent to the supporting arm. The inner ends of the control wires 32, 32 are secured to the opposite side edges of a generally triangular control member 34 which in turn is pivotally mounted at its mid-point to the wing of the airplane, for example, as indicated at 35 in Fig. 1. A control rod 36 is secured to the rear central portion of the control member 34 and extends toward the tail section of the

airplane. The extreme rearward end of the control rod is engaged within an opening in a lug 37 extending upwardly from the elevator 14.

During pivotal movement of the pivotal control member 34 about its mid-point 35, the control rod 36 is moved back and forth, and during rearward movement thereof, the elevator 14 is pivoted downwardly about its pivot 15 toward the lower limit position shown in Fig. 3 and during movement of the control rod 36 to its forward limit position, the elevator is pivoted upwardly to its upper limit position as shown in Fig. 3.

By this construction, movement of the control lever 27 to its forward limit position in turn will cause the control wires 32, 32 to pivot the control member 34 in the clockwise direction relative to Fig. 1 thereby moving the elevator 14 to its lower limit position. With the elevator 14 in its lower limit position, the air pressure created by forward movement of the vehicle to which the plane is attached will cause the plane to dive downwardly, twisting the supporting arm in the counter-clockwise direction relative to Fig. 1 and simultaneously bending the supporting arm downwardly, thereby simulating the movement of a free-flying airplane. Conversely, upon movement of the control lever 27 to its rearward limit position the control member 34 is pivoted in the opposite direction causing the elevator to be raised to its upper limit position thereby causing the airplane to climb assuming the upper position shown in Fig. 2, when the automobile to which the plane is attached is moving.

Figs. 4 to 7, inclusive, illustrate a modified form of the present invention wherein a toy airplane is caused to pivot about a transverse axis from a central horizontal position to upwardly and downwardly inclined limit positions. When the airplane is moved to a downwardly inclined position, the air pressure created by forward movement of the vehicle on which the airplane is mounted, will cause the plane to dive downwardly. Similarly, when the plane is tilted upwardly while the vehicle is moving, the plane will climb upwardly.

Referring to Fig. 4, reference number 40 designates generally an airplane comprising a body or fuselage 41, a wing 42 and a tail section 43. The airplane is secured to one end of a flexible supporting arm 44, for example, by means of a bolt 45 extending through the body portion of the airplane 41 and engaging the supporting arm 44, as illustrated in Fig. 5. The airplane is mounted on the supporting arm in such a manner that when the supporting arm is unflexed and in a horizontal position, the airplane will also be in a horizontal position. The supporting arm comprises an elongated flat narrow strip of a flexible material such as, for example, spring steel or a suitable plastic material and may easily be flexed upwardly or downwardly from a horizontal plane.

In accordance with the present invention, the supporting arm is carried by mounting means which may be mounted on the window of an automobile or like vehicle with the supporting arm extending outwardly of the vehicle, and control mechanism is provided to rotate the supporting arm a limited amount about its longitudinal axis and thereby move the airplane from its central horizontal position to the above-mentioned upwardly and downwardly inclined limit positions wherein the airplane is caused to climb upwardly and dive downwardly, respectively.

The mounting means comprises a generally inverted U-shaped bracket 46 having a pair of spaced apart downwardly inclined legs 47 and 48. A wing-bolt 49 is threaded through the one leg 48 and is secured to a movable plate 51 positioned inwardly of the leg 48. The inner surface of the movable plate 51 and the inner surface of the leg 47 of the mounting bracket are padded, for example, by means of felt pads 52 and 53, respectively, which bear against opposite sides of the window of the vehicle when the wing-bolt 49 is tightened and

maintain the mounting bracket 46 in position on the window of the vehicle. A mounting plate 55 having upwardly extending lugs 56, 56 at opposite sides thereof is secured to the upper surface of the mounting bracket 46, for example, by means of a pair of bolts 57, 57 extending through the bracket 46 and mounting plate 55 and terminating above the upper surface of the mounting plate 55. A supporting pin 58 extends through openings in the lugs 56, 56 and also extends through leg portions 59, 59 projecting downwardly from the mid-point of a control plate 60, thereby pivotally mounting the control plate 60 upwardly adjacent the mounting plate 55. The supporting arm 44 is secured to the upper surface of the control plate 60 by means of a flat plate 61 positioned upwardly adjacent the supporting arm 44 and in engagement with the upper surface of the control plate 60, and clamped to the control plate 60 by means of a pair of bolts 62, 62.

As illustrated in Fig. 6, the bolts 62, 62 are positioned immediately above the bolts 57, 57 and the terminal ends of the pairs of bolts 62, 62 and 57, 57 are engaged within compressed coil springs 63, 63 spaced equally at opposite sides of the pin 58. The springs 63, 63 thereby resiliently maintain the control plate 60 in spaced parallel relation relative to the mounting plate 55.

The inner end of the supporting arm 44 extends inwardly beyond the mounting means and control plate and has a control lever 65 secured thereto, for example, by means of bolt 66. The control lever 65 projects vertically upward from the supporting arm 44, and the springs 63, 63 normally maintain the control lever 65 in the vertical position, as shown in Fig. 6. However, by moving the control lever 65 to its forward and rearward limit positions, as illustrated in dotted lines in Fig. 6, against the pressure of the coil springs 63, 63 the supporting arm 44 may be rotated about its axis which in turn causes movement of the airplane from the horizontal position to its downwardly and upwardly inclined limit positions, respectively.

Thus, during operation of the airplane when it is attached to a moving vehicle, the control lever will normally remain in its central position with the supporting arm 44 in a horizontal plane. To cause the airplane to dive downwardly, the control lever is moved to its forward limit position thereby rotating the supporting arm 44 in the counter-clockwise direction relative to Fig. 4 which in turn causes the airplane to assume a downwardly inclined position as shown in broken lines in Fig. 5. The pressure on the wing of the airplane due to the movement of the plane through the air will then cause the plane to dive downwardly flexing the supporting arm 44 downwardly. Conversely, when the control lever is moved to its rearward limit position and the plane is tilted to its upwardly inclined position, the air pressure due to movement of the plane through the air will cause the plane to climb and at the same time flex the supporting arm upwardly.

From the foregoing, it will be apparent that the present invention provides a novel toy airplane which may be attached to the window of an automobile or similar vehicle and during movement of the vehicle, the airplane may be caused to dive or climb upon actuation of control mechanism within the vehicle and the airplane will simulate movement of a free-flying airplane.

While particular embodiments of the present invention have been illustrated and described herein, it is not intended to limit the invention to such a disclosure, and changes and modifications may be incorporated and embodied therein within the scope of the following claims.

I claim:

1. A maneuverable toy airplane comprising a model toy airplane consisting of a fuselage, wings, and tail assembly, adapted to be mounted outwardly of a movable vehicle; an elevator pivotally secured to said tail assembly and actuatable between upper and lower limit positions,

an elongated flat flexible supporting arm, said supporting arm adapted to be flexed upwardly and downwardly a limited amount, mounting means carried by one end of said supporting arm removably mounting said supporting arm to said vehicle with the arm extending outwardly from said vehicle, means securing said airplane to the outer end of said supporting arm with the airplane lying in a substantially horizontal plane, and control mechanism carried by said mounting means projecting interiorly of said vehicle adjacent said one end of said supporting arm actuatable between opposite limit positions and operable during movement to one of said limit positions to actuate said elevator to its lower limit position wherein said airplane is caused to dive downwardly during forward movement of said vehicle, said control mechanism operable during movement to its other limit position to actuate said elevator to its upper limit position wherein said airplane is caused to climb upwardly during forward movement of said vehicle.

2. A maneuverable toy airplane comprising a model top airplane consisting of a fuselage, wings, and tail assembly, adapted to be mounted outwardly of a movable vehicle; an elongated flat flexible supporting arm, said supporting arm adapted to be flexed upwardly and downwardly a limited amount from a horizontal plane, mounting means carried by one end of said supporting arm removably mounting said supporting arm to said vehicle with the arm extending outwardly from said vehicle and lying in a substantially horizontal plane, means securing said airplane to the outer end of said supporting arm with the airplane lying in a plane substantially parrallel to the plane of said supporting arm, an elevator pivotally secured to said tail assembly and actuatable from a horizontal position to upper and lower limit positions, and control mechanism carried by said mounting means projecting interiorly of said vehicle adjacent said one end of said supporting arm actuatable between opposite limit positions and operable during movement to one of said limit positions to actuate said elevator to its lower limit position wherein said airplane is caused to dive downwardly during forward movement of said vehicle, said control mechanism operable during movement to its other limit position to actuate said elevator to its upper limit position wherein said airplane is caused to climb upwardly during forward movement of said vehicle.

3. A maneuverable toy airplane comprising a model toy airplane consisting of a fuselage, wings, and tail assembly, adapted to be mounted outwardly of a movable vehicle; an elevator pivotally secured to said tail assembly actuatable between upper and lower limit positions, a member pivotally secured to said airplane for pivotal movement between opposite limit positions, an operating rod interconnecting said pivotal member and said elevator and operable during movement of said pivotal member to one limit position to actuate said elevator to its upper limit position and during movement of said pivotal member to its opposite limit position to actuate said elevator to its lower limit position, an elongated flat flexible supporting arm, said supporting arm adapted to be flexed upwardly and downwardly a limited amount, mounting means carried by one end of said supporting arm removably mounting said supporting arm to said vehicle with the arm extending outwardly from said vehicle, means securing said airplane to the outer end of said supporting arm with the airplane lying in a substantially horizontal plane, a control member pivotally mounted on said mounting means projecting interiorly of said vehicle adjacent said one end of said supporting arm, a pair of spaced parallel control wires interconnecting said control member and said pivotal member, said control member being actuatable between opposite limit positions and operable upon movement to one of said limit positions to actuate said pivotal member to its said one limit position wherein said elevator is moved to its upper limit position, said control member operable durng movement to its opposite limit position to actuate said pivotal member to its other limit position wherein said elevator is moved to its lower limit position.

4. A maneuverable toy airplane comprising a model toy airplane consisting of a fuselage, wings, and tail assembly, adapted to be mounted outwardly of a movable vehicle; an elevator pivotally secured to said tail assembly actuatable from a horizontal position to upper and lower limit positions, a member pivotally secured to said airplane for pivotal movement between opposite limit positions, an operating rod interconnecting said pivotal member and said elevator and operable during movement of said pivotal member to one limit position to actuate said elevator to its upper limit position and during movement of said pivotal member to its opposite limit position to actuate said elevator to its lower limit position, an elongated flat flexible supporting arm, said supporting arm adapted to be flexed upwardly and downwardly a limited amount from a horizontal plane, mounting means carried by one end of said supporting arm removably mounting said supporting arm to said vehicle with the arm extending outwardly from said vehicle and lying in a substantially horizontal plane, means securing said airplane to the outer end of said supporting arm with the airplane lying in a plane substantially parallel to the plane of said supporting arm, a control member pivotally mounted on said mounting means projecting interiorly of said vehicle adjacent said one end of said supporting arm, a pair of spaced parallel control wires interconnecting said control member and said pivotal member and extending in spaced parallel relation with said supporting arm, said control member being actuatable between opposite limit positions and operable upon movement to one of said limit positions to actuate said pivotal member to its said one limit position wherein said elevator is moved to its upper limit position, said control member operable during movement to its opposite limit position to actuate said pivotal member to its other limit position wherein said elevator is moved to its lower limit position.

5. A maneuverable toy airplane comprising a model toy airplane consisting of a fuselage, wings, and tail assembly adapted to be mounted outwardly of a moving vehicle; an elongated flat flexible supporting arm operable to be flexed upwardly and downwardly a limited amount from a horizontal plane, mounting means carried by said supporting arm adapted to removably secure said supporting arm to said vehicle with the arm extending outwardly generally perpendicular to the direction of travel of the vehicle and lying in a substantially horizontal plane with one side edge of the supporting arm facing in the direction of travel of the vehicle, means fixedly securing said airplane to the outer end of the supporting arm with the airplane lying in a plane substantially parallel to the plane of the supporting arm, and control mechanism carried by said mounting means projecting interiorly of said vehicle adjacent said one end of said supporting arm actuatable between opposite limit positions and operable during movement to one of said limit positions to actuate at least a portion of said airplane to a position inclined downwardly from the horizontal and simultaneously cause at least a portion of said supporting arm to be inclined downwardly a limited amount from the horizontal with said one side edge of the supporting arm still facing substantially in the direction of travel of the vehicle whereby said airplane is caused to dive downwardly below said horizontal plane during forward movement of said vehicle, said control mechanism operable during movement to its other limit position to actuate at least a portion of said airplane to a position inclined upwardly from the horizontal and simultaneously cause at least a portion of said supporting arm to be inclined upwardly a limited amount from the horizontal with said one side edge of the supporting arm still facing substantially in the direction of travel of the vehicle whereby said air-

plane is caused to climb upwardly above said horizontal plane during forward movement of the vehicle.

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