Jan. 1, 1952 D. J. BYERS 2,580,405

TETHERED FLYING MODEL AND OBJECT-RELEASING MECHANISM

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Fig. 1

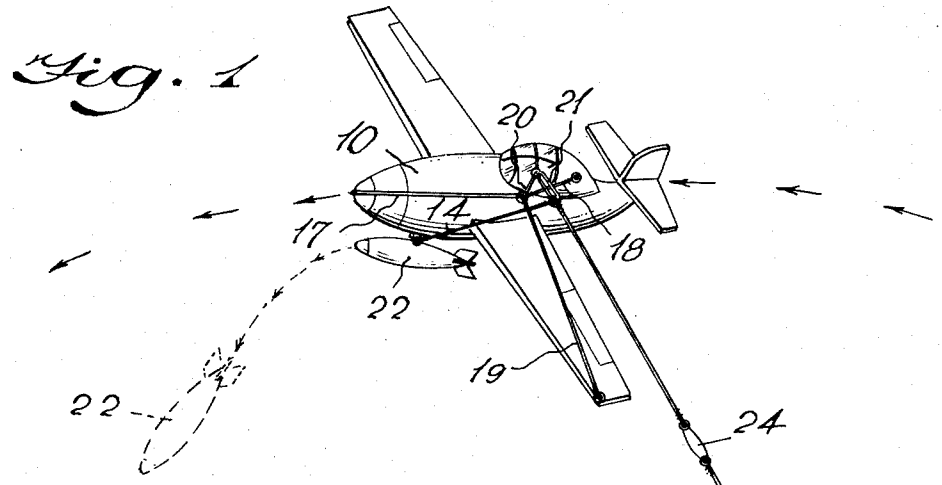


Fig 2

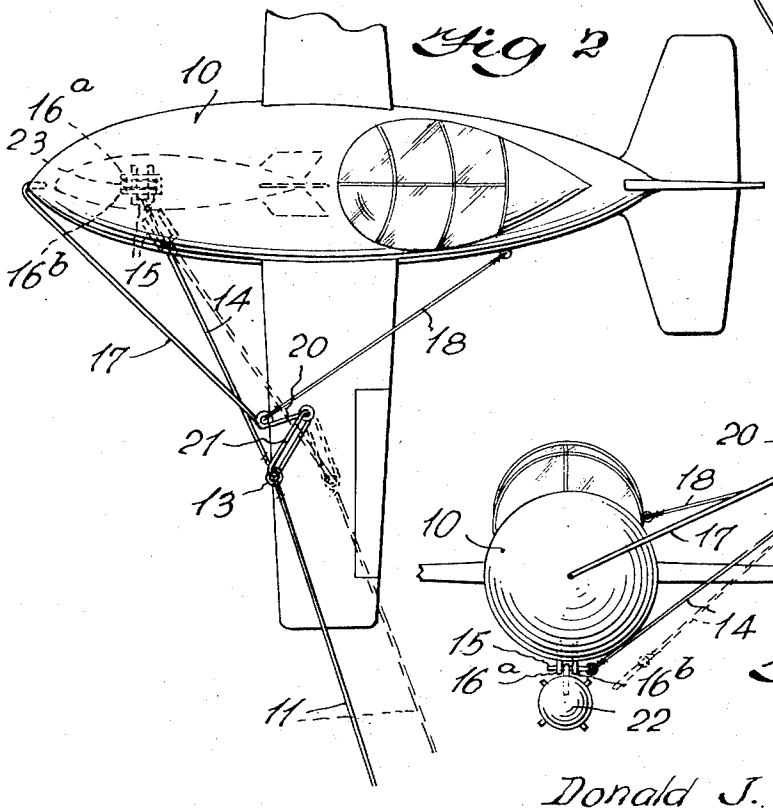


Fig. 3

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TETHERED FLYING MODEL AND OBJECT RELEASING MECHANISM

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3 Claims. (Cl. 46—77)

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This invention relates to new and useful improvements in models of the type that are operated and/or controlled by means of a tether.

Objects of the invention include: provision of a device that may be used and operated in such a manner as not only to simulate the behavior of an airplane in flight, but also realistically execute maneuvers such as guiding, jettisoning tanks, releasing parachutes, dropping bombs, these functions to be accomplished without resort to remote control or to complicated mechanisms involving a plurality of cords to produce desired effects; and provision of simplified controlling and operating means for such models.

Further objects of this invention are: the provision of a toy or amusement device, and the provision of a device that can be used for certain instructional or educational purposes.

In the form illustrated and described this invention is directed to the construction of a model bombing plane with novel features, hereinafter described in detail, designed to increase the interest of the device for youngsters and hobbyists.

Model flying machines controlled by a tether are known to the art. Such models are flown about a center to simulate the action of a full-sized airplane in flight. Conventionally, motion is imparted by manual power through a tether retained in the hand of the operator, or, in more elaborate models, the power may be imparted through motor driving mechanisms such as gasoline engines, control being effected through a plurality of cords or tethers attached to the model, such being sometimes termed U-line models.

The following explanation of the operation of my invention is believed to account to a considerable extent for the novel and unexpected results which I have been able to obtain, and is presented for the purpose of rendering the disclosure of the operation of my invention as clear as possible rather than as a complete description of the physical laws underlying the operation.

For any given period of operation the speed of the model is relatively constant, and the centrifugal pull on the tether is correspondingly constant. This condition renders possible use of a mechanism on the model having sufficient frictional engagement to remain inoperative by the centrifugal pull, and requiring an added pull to be actuated. Thus the pull on the tether is critical, and while it would seem that by whirling the model it would be possible to exert by sole-

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ly centrifugal force sufficient pull to withdraw the pin, I have found by actual test that when the pin is set properly, this cannot be done although if while so whirling the model an added force is supplied by a quick tug on the tether it can easily be done. This surprising behavior seems to follow from the fact that the speed of the whirling model cannot be increased indefinitely but is limited obviously by friction with the air, although this is not necessarily the sole limiting factor. Whatever the explanation may be I have found that with the mechanism set properly it is not possible to operate same merely by the centrifugal force, and that it is necessary to give the tether an extra pull before the disengaging mechanism will operate. I have found moreover that a surprisingly light quick pull on the tether is sufficient to trip the mechanism so that the flight of the plane remains substantially undisturbed.

To illustrate the invention in principle and operation I have chosen to describe an embodiment comprising a toy or model airplane provided with a bomb-dropping mechanism.

Figure 1 is a perspective view showing the model airplane in operation.

Figure 2 is a plan view of the model airplane.

Figure 3 is a vertical elevation of same.

These drawings together with the ensuing description disclose a toy or model airplane comprising a body adapted to be rotated and suspended by centrifugal force and the lift of the air, the model being provided, in combination with the body portion, with an operating element, shown as a connector or lanyard **14**, and with restraining and operating means shown as tether **11**, the tether and lanyard being disposed in operatively angular alignment, and with controllable mechanism illustrated as a disengaging mechanism for releasing object **22**, in response to impulses transmitted through the tether, whereby flight and adjunct functions are simulated.

In operation the body **10** is rotated manually by the tether **11**, held in the hand designated as **12**, of the operator. The tether is attached at point **13** to a lanyard **14** which also is connected to spring pin **15**. This pin is formed of elastic material and has an outward tension causing it to bear frictionally against retaining eye **16** (*a* and *b*) wherefrom it may be withdrawn by exertion of a predetermined force.

When the airplane is normally operated the centrifugal force exerted on the spring pin

through the lanyard is insufficient to withdraw the pin. However a jerk or tug on the tether provides the additional force necessary to overcome the friction between the pin and eye whereby the pin is withdrawn thus releasing bomb 22. This operation may be effected without substantially disturbing the flight of the airplane.

Insertion in the tether of a swivel 24 improves the operation.

In the species illustrated a spring strut 17 is attached at one end to the forward part of the body where it may be cemented or otherwise fixed in relation to the body, and at the other to stays 18 and 19. An extension 20 of the strut projects at an angle thereto and the free end of the extension forms a pinion for yoke 21 connecting the free end to the tether and lanyard at point 13.

Strut 17 may be formed of material such as spring wire having sufficient elasticity to exert an upward tension on the stay cords 18 and 19 thus acting as a supporting element for the yoke. Stay cords 18 and 19 may be reefed in or lengthened to obtain optimum operative adjustment of the mechanism. Stay 19 is omitted from Figure 2 in order to more clearly show the operative features.

In Figure 1 the pin is shown in engaged position. In Figures 2 and 3 the pin, lanyard, yoke and tether are shown in engaged position and disengaged position respectively, the former being depicted by solid lines and the latter position by dotted lines; and in these figures the relative difference in position has been emphasized in order to more clearly illustrate the operation, particularly in Figure 3. In actual operation the tether does not move through as great an angle as that shown, retaining a somewhat closer alignment with its original (engaged) position.

From the foregoing description modifications operating on the basic principle will be apparent to those skilled in the art. The object 22 shown as a bomb, obviously may be made to simulate a fuel tank, parachute, or any desired object, and may be positioned appropriately with reference to the body. A plurality of such objects can be consecutively released by providing a suitable magazine and releasing mechanism. Or suitable means can be provided for moving controls and actuating mechanisms other than releasing devices.

Various modifications of the force transmitting means will be apparent to those skilled in the art. I have found that stay 19 is not always necessary to effect satisfactory operation. The entire strut and stay system could be replaced by other operating means provided the disengaging means embodies the basic principle of being operative only on application of an additional force. Other disengaging mechanisms may be used in place of the spring pin and eye device illustrated. In some instances the yoke may be eliminated and the tether and lanyard connected directly to the strut.

Having thus for purposes of illustration described an example of my invention I do not wish to be understood as being limited by the terms of such description inasmuch as various modifications and embodiments may be made without departing from the scope of my invention, but what I claim and desire to protect by Letters Patent is:

1. A controllable flying model adapted to be flown in a path approximating a circle, a tether connected thereto to restrain said model against the action of centrifugal force, said model being provided with an object-releasing mechanism operable by means of said tether, comprising a pin and eye, said pin bearing frictionally against said eye, and being movable by and in the direction of said tether, said pin and eye being releasably engageable with a carried object, said pin being withdrawable by exertion of a predetermined force, said tether being attached to said model and to said object-releasing mechanism.

2. A controllable flying model adapted to be flown in a path approximating a circle, a tether connected thereto to restrain said model against the action of centrifugal force, said model being provided with an object-releasing mechanism operable by means of said tether, comprising a pin and eye, said pin bearing frictionally against said eye, and being movable by and in the direction of said tether, said pin and eye being releasably engageable with a carried object, provided with an opening to receive said pin, said pin being withdrawable by exertion of a predetermined force, said tether being attached to said model and to said object-releasing mechanism.

3. In combination, a flying model having an object-releasing mechanism thereon, a tether one end of which is adapted to be manually motivated to impel the model in a circular path and the other end of which is connected to said mechanism, said mechanism including a pin and eye, the object to be released having another eye, said pin extending through both of said eyes and being in frictional engagement with at least one of them to secure the object to the model when the tension in the tether is below a predetermined value and to release the object when the tension in the tether is above said value, and a cable connecting the tether to the model independently of said pin and eyes.

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