July 3, 1951 O. L. ST. CLAIR 2,559,050

AUTOMATIC REEL FOR CONTROLLING SELF-PROPELLED MODEL AIRPLANES

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Fig. 1.

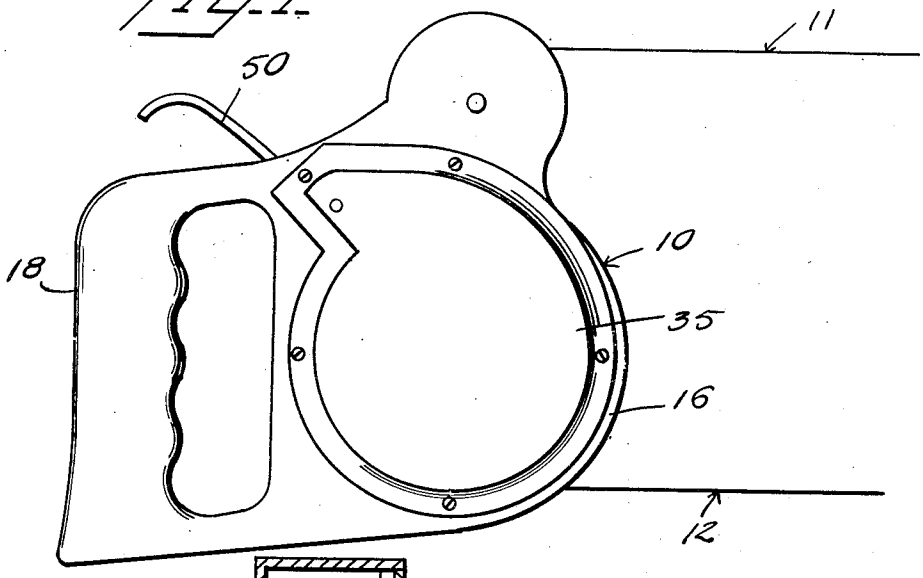


Fig. 4.

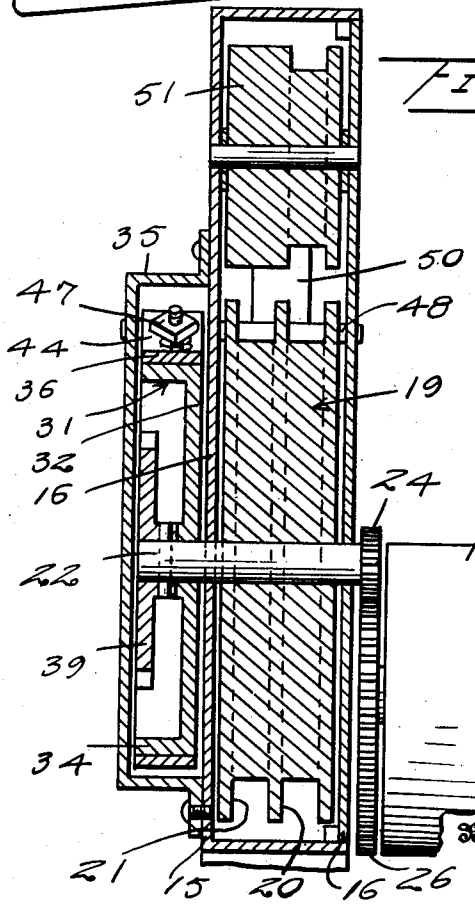
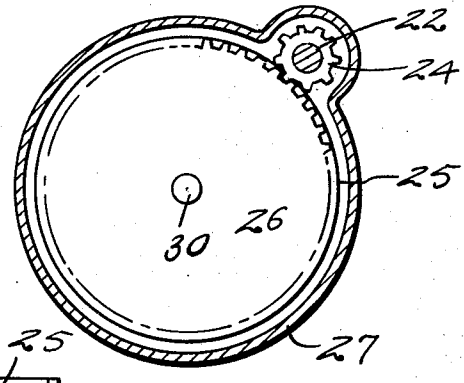


Fig. 5.



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FIG. 2.

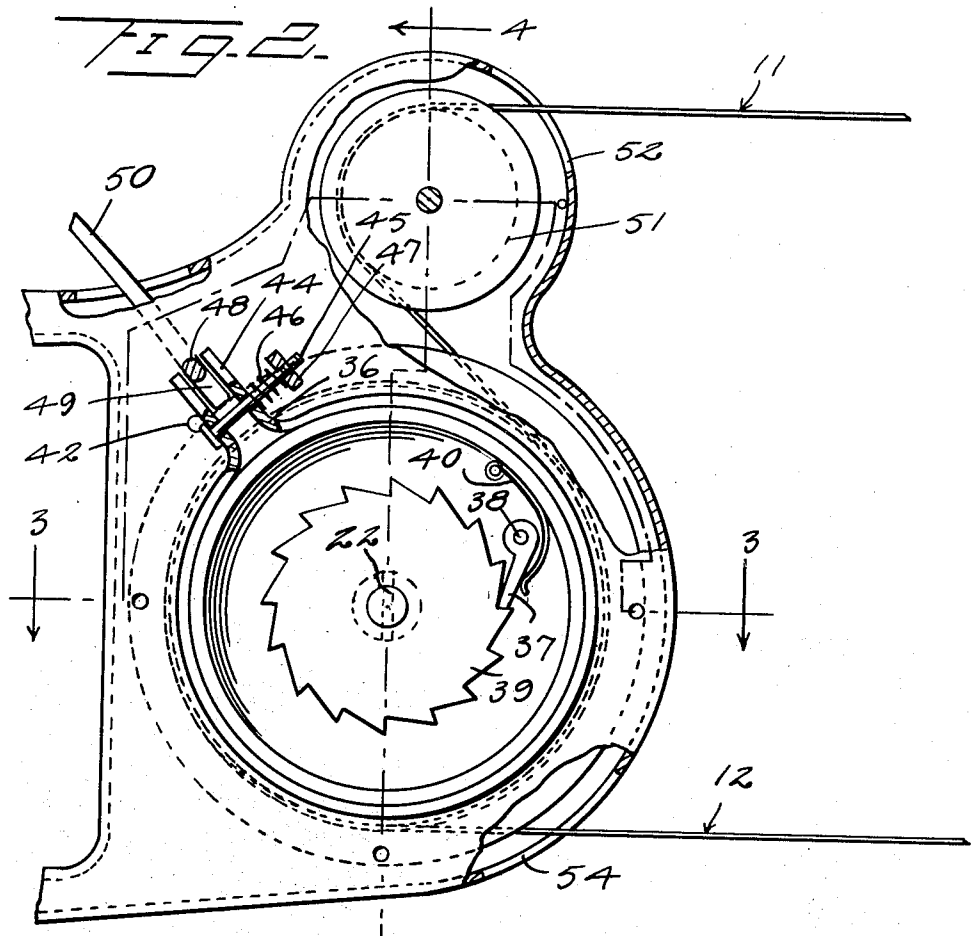
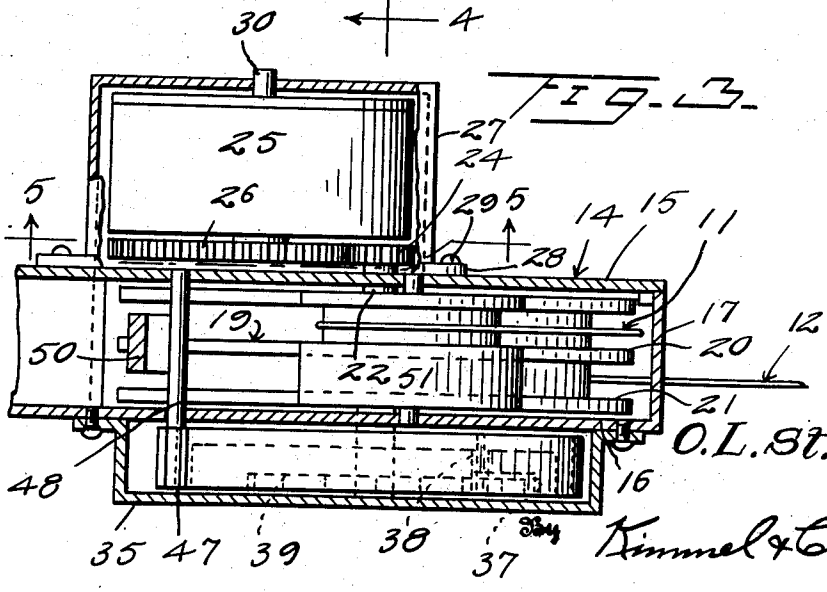


FIG. 3.



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AUTOMATIC REEL FOR CONTROLLING SELF-PROPELLED MODEL AIRPLANES

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Application July 2, 1948, Serial No. 36,763

2 Claims. (Cl. 242—107)

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This invention relates to an automatic reel for use in controlling self propelled model airplanes.

It is an object of this invention to provide a reel of the kind to be more particularly described hereinafter for automatically keeping a tension on the control cables which are connected to the control unit of a model airplane during its tethered flight.

Another object of this invention is to provide an operator's control unit for a model airplane having a pistol grip form of handle on which is mounted a spring pressed winding drum the operation of which is under the finger tip control of the operator whereby the attitude of the airplane and its distance from the operator are under his constant control.

A further object of this invention is to provide an operator's control unit for self propelled model airplanes having a spring pressed winding drum for automatically taking up the slack in the control lines when the flight path of the model approaches the operator, thereby holding the model under constant control of the operator irrespective of the position of the model relative to the operator.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a side elevation of the automatic reel for controlling self propelled airplanes constructed according to an embodiment of this invention;

Figure 2 is a fragmentary side elevation partly broken away and partly in section;

Figure 3 is a transverse section taken on the line 3—3 of Figure 2;

Figure 4 is a vertical section taken on the line 4—4 of Figure 2;

Figure 5 is a fragmentary detailed section taken on the line 5—5 of Figure 3.

Referring to the drawings, the numeral 10 designates generally an operator's control unit for controlling the flight path of a model airplane which is propelled by a gasoline model engine or other similar device. The operator's control unit 10 is used in connection with the model airplane for controlling certain of the control surfaces which are movable on the model. The control unit 10 is adapted to be connected to the model and to the control surfaces thereof by flexible lines 11 and 12 which may be of wire or rope or other suitable material. The control unit 10 is formed of a central frame member 14 having two side plates 15 and 16 connected together at one end

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by an outer wall 17 and at the other end by a pistol grip handle 18. A reel 19 having two peripheral grooves 20 and 21 is rotatably mounted between the side walls 15 and 16 of the frame. A shaft as 22 is journalled in the side walls and is fixed to the hub of the pulley 19. A pinion gear 24 is fixed on the end of the shaft 22 on the opposite side of one of the side walls as 15 for connecting the pulley or winding reel to a source of motive power. An enlarged coil spring 25 is supported outside of the frame 15 and is connected to the shaft 22 by a driving gear 26. The spring 25 is contained within a housing 27 formed with flanges 28 on the outer edges thereof through which fastening bolts 29 are engaged for securing the housing 27 to the frame 14. A shaft 30 is rotatably supported in the housing 27 and the spring 25 is fixed at one end to the shaft. The other end of the spring is fixed in the housing so that rotation of the shaft will effect tensioning of the coil spring in the housing 27. The enlarged driving gear 26 is fixed on the shaft 30 and meshes with the spur gear 24 for rotating the winding drum 19 due to the tension on the spring 25.

A brake drum 31 is loose on the shaft 22 which extends outwardly through the other side wall 16 of the frame 14. The brake drum 31 is formed with an annular base plate 32 having a peripheral outward extending flange 34 formed integral therewith. A housing 35 encloses the brake drum 31 and the brake band 36 secured about the drum. A pawl 37 is pivotally mounted to the flat plate 32 of the brake drum within the limits of the peripheral flange 34. The pawl 37 is rockably mounted on a pivot pin 38 for engagement with a ratchet wheel 39 also fixed on the shaft 22. A spring 40 constantly urges the pawl 37 into engagement with the teeth of the ratchet 39 to provide for the rotation of the brake drum 31 in one direction with the winding reel 19. The brake band 36 engages about the periphery of the brake drum 31 to provide for the selective locking of the brake against rotation and the freeing of the brake to provide for the rotation of the winding drum in the opposite direction. The ends of the brake band 36 are disposed radially of the shaft 22 and one end of the band is fixed relative to the housing 35 by a pin 42. The other end 44 of the brake band is secured to the fixed end by a pin 45 which engages through the outturned ears thereof. The ear 44 is loose on the pin 45 and a spring 46 about the pin 45 constantly presses the ear 44 towards the fixed end of the band thereby tightening the brake band about the brake drum. The spring 46 is positioned between the outer surfaces of the ear 44 and a nut 47,

threadably engaged on the outer end of the pin 45.

A shaft 48 is rockably mounted in the walls 15 and 16 of the main frame and extends outwardly into the housing 35. A cam 49 is fixed on the outer end of the shaft 48 and engages between the two ears at the ends of the brake band. A brake operating handle 50 is also fixed on the shaft 48 and extends upwardly out of the main housing or frame where it may be readily reached by the fingers of an operator. Rocking of the lever 50 will effect rotation of the shaft 48 and rock the cam 49 for pressing the ear 44 of the brake band against the tension of the spring 46 thereby relieving the frictional force of the brake band on the brake drum 31. In this manner the brake drum is held against rotation at the will of the operator and the winding drum 19 is held against rotation in one direction due to the action of the pawl and ratchet connection between the winding drum 19 and the brake drum 31. In the locked position of the brake drum the winding drum 19 is free to rotate in one direction as the pawl 37 will slip over the inclined edges of the teeth of the ratchet.

The idler wheel 51 is rotatably mounted in the main frame 14 above the winding reel 19. The idler wheel or pulley 51 is formed with a single groove so that the upper stretch of the cable 11 will be trained over the upper edge of the idler wheel and around the outer side thereof down onto one groove as 20 of the main winding drum 19. The lower control line 12 engages the other groove 21 of the main pulley 19 for operation together with the movement of the upper cable 11. The upper cable 11 extends through an opening 52 in the upper end of the main frame or housing and the lower control cable 12 extends through an opening 54 in the lower end of the frame. The pistol grip handle 18 is positioned rearwardly of the drums 19 and 51 substantially between the points from which the control cables extend from the main frame. The positioning of the handle or pistol grip 18 between the stretches of the control cable 11 and 12 provides for the tensioning of one of the cables and the slacking of the other cable upon rocking of the handle in the hand of an operator. By this movement the control surfaces of the model airplane are moved as desired.

In the use and operation of the operator control unit 10 a constant tension is maintained on the control lines 11 and 12. When the model is initially set in motion an outward force is exerted on the cables 11 and 12 and the operator by releasing the brake will permit the brake drum 31 to rotate with the pawl and ratchet for rotating the winding drum 19 to pay out the control lines 11 and 12. When the model has reached a distance of the desired radius of operation the brake band 36 is frictionally engaged with the brake drum 31 for limiting the rotation of the winding drum 19 in a direction for maintaining the lines 11 and 12 at a constant tension. Outward radial movement of the model will increase the tension on the lines 11 and 12 to the point where the tension will effect the control surfaces of the model. Flight of the model in a direction toward the operator will relieve the tension on the control lines and this slack will be taken up by the reverse action of the winding drum due to the reeling in rotation effected by the coil spring 25. As the tension is relieved the winding drum 19 is rotated relative to the brake drum and the ratchet teeth 39 will slip past the pawl 37 in one direction so that any further increase in the tension on the lines will limit the outward movement of the model until the brake has been released permitting rotation of the brake drum 31 due to the tension on the control lines.

I do not mean to confine myself to the exact details of construction herein disclosed but claim all variations falling within the purview of the appended claims.

What is claimed is:

1. An operator's control device for attachment to the control lines of a model airplane comprising a frame, a hand grip on said frame, a shaft journalled in said frame, a winding drum fixed on said shaft and with which the control lines are connected, an idler wheel rotatably mounted in said frame, said idler being spaced from said drum with one of the control lines trained thereover, spring means for rotating said drum in one direction for simultaneously winding in the control lines, a brake drum freely rotatable on said shaft, a ratchet means carried by said shaft and operatively connected to the brake drum for rotation with said winding drum in the other direction of rotation thereof by the pull of said control lines, a spring-urged brake band about said brake drum for controlling the rotation of said brake drum, means for controlling the tension of said brake band on said brake drum, said controlling means including a spring pressed member constantly urging said brake band to braking position, and a manually operable cam for effecting a release of said brake band, and correlated means carried by said brake drum and said shaft permitting rotation of said winding drum in said one direction relative to said brake drum.

2. An operator's control device for attachment to the control lines of a model airplane for maintaining a constant tension on said lines comprising a control handle, winding means associated with said handle for reeling in and paying out said control lines simultaneously from two points sufficiently spaced to permit the gripping of the handle intermediate said points for controlling the flight of said model without disturbing the control effected by said handle through said lines, and control means for maintaining a constant tension on said lines irrespective of a decrease in the radius of the flight path of said model said control means being comprised of a brake drum rotatably mounted in said handle adjacent said winding means, said winding means having at least one winding drum rotatable in said handle, a releasable brake band encircling said brake drum and in spring engagement therewith, said brake band having a pair of spaced ends, cam means carried by said handle and disposed between said ends for releasing said brake band on cammed action thereof, ratchet means extending between said winding drum and said brake drum for limiting free rotation of the winding drum to re-wind movement, and a variable tension spring rotatably connected to said winding drum for maintaining re-wind tension thereon.

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