Oct. 4, 1955 P. F. PETERSON 2,719,459

AMMUNITION BOOSTER

Filed June 13, 1949 2 Sheets-Sheet 1

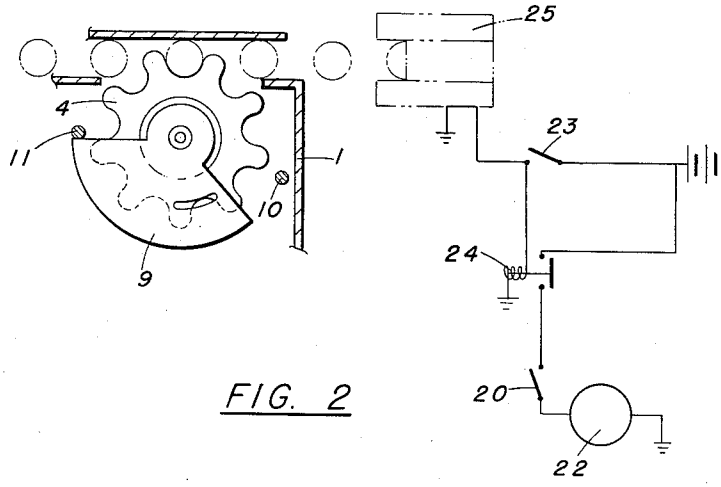


FIG. 2

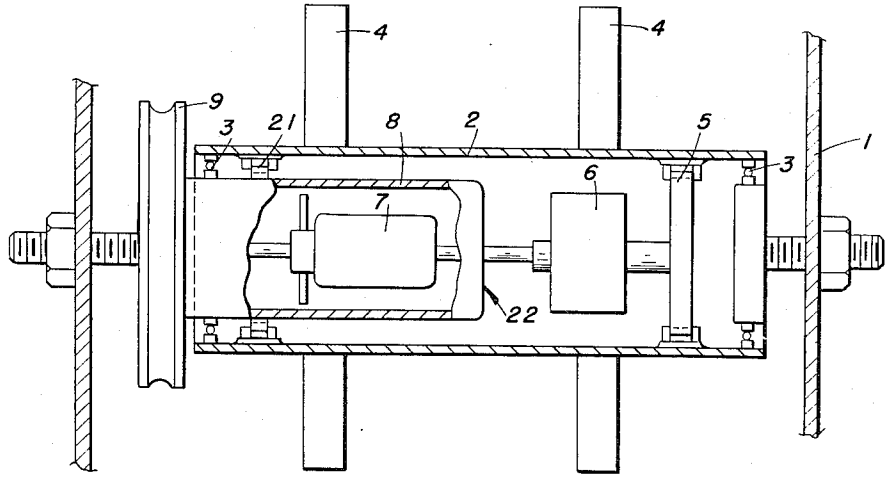


FIG. 1

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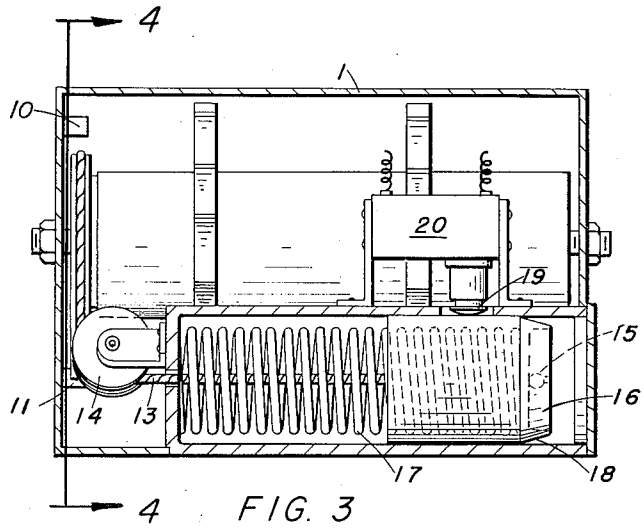


FIG. 3

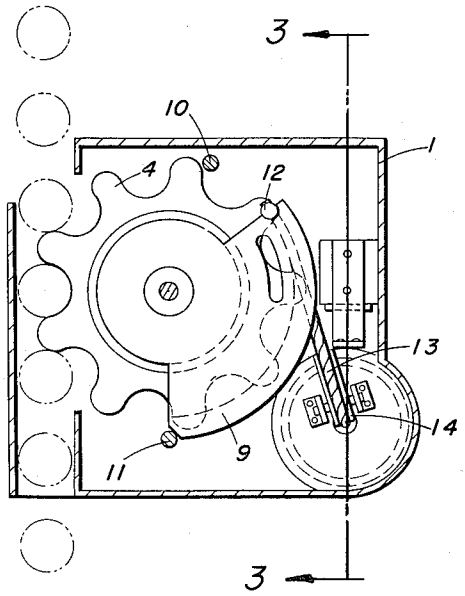


FIG. 4

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United States Patent Office 2,719,459 Patented Oct. 4, 1955

2,719,459

AMMUNITION BOOSTER

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Application June 13, 1949, Serial No. 98,799

6 Claims. (Cl. 89—33)

This invention pertains to a booster arrangement for ammunition.

In armed airplanes which travel at speeds which approach or pierces the sonic barrier it has been found necessary to have the booster motor not only draw the ammunition from the cartridge box but also exert a positive driving force upon ammunition located between the booster motor itself and the automatic firearm. This is particularly true in instances where acceleration forces amount to several times the acceleration force due to gravity.

In the past, booster motors have relied upon the slack in the portion of the ammunition belt between the booster and the gun for controlling operation of the booster motor In other words, upon cessation of firing of the gun the booster motor, in tending to urge more ammunition to the gun, causes slack in the ammunition line between the booster and the gun which in turn results in the functioning of a device for stopping further operation of the booster motor.

This arrangement has been found to be unsatisfactory in present type aircraft wherein acceleration forces amounting to over seven G's have been found to exert such force on the ammunition as to cause malfunctioning of the gun.

Accordingly, it is an object of this invention to provide an ammunition booster arrangement which not only pulls the ammunition from its box, but also positively pushes the ammunition from the booster to the gun.

It is another object of this invention to provide a booster arrangement which overcomes the inertia of the weight of the ammunition and the operational parts of the booster motor immediately upon commencement of firing of the gun.

Other objects of invention will become apparent from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a view partially in section of an arrangement of the invention;

Fig. 2 is a wiring diagram used in connection with the invention;

Fig. 3 is a sectional view similar to Fig. 1, but taken along the line 3—3 of Fig. 4; and

Fig. 4 is a view along the line 4—4 of Fig. 3.

Referring to the drawings, 1 is a support for the booster which may comprise a casing for appropriate attachment to an airplane, or other structure, adjacent a box from which ammunition is to be fed to a machine gun. The booster may, of course, be located somewhere between the ammunition box and the machine gun. Rotatably mounted on the support by bearings 3 is a housing 2 and sprockets 4 for engaging belted ammunition. The housing 2 is adapted to be driven through a conventional roller clutch 5 and gear box 6 by an armature 7 of a motor 22 which in turn is suitably mounted with respect to field 8, schematically shown in the drawing. Integrally connected with field 8 is a sector 9 mounted for rotation with respect to support 1 between the limits of

stop members 10 and 11. Attached to sector 9 by a pin 12 is a cable member 13 adapted to roll over pulley 14 and be attached at its other end at 15 to a housing 16 for encompassing compression spring 17. The housing is provided with a tapered part 18 adapted to engage portion 19 of microswitch 20 to actuate the same. A roller clutch 21 is provided between field 8 and housing 2 to hold the field with spring 17 compressed, as hereinafter more fully explained.

Referring now to Fig. 2, microswitch 20 is adapted to control flow of electricity to motor 22 in response to a gun-firing switch 23 and a time delay relay 24. In the operation of the device with the gun-firing switch 23 closed and the gun firing, switch 20 is also closed, as shown in Fig. 3, to thereby result in the flow of electric current to booster motor 22. Operation of booster motor 22 results in rotation of the gears shown diagrammatically at 6 in Fig. 1, which in turn, through roller clutch 5, drive housing 2 and sprockets 4 for feeding ammunition to the gun. Upon release of switch 23 gun 25 ceases to fire, and time delay relay 24 maintains circuit to motor 22 closed for a preselected time—say, one tenth of a second. Since the gun has ceased firing and the ammunition between the booster motor and the gun prevents further rotation of sprockets 4 and housing 2, the armature 7 of the motor will stop, with the result the the field 8 will be caused to rotate in a counterclockwise direction, as shown in Fig. 4, to compress spring 17 until element 19 in microswitch 20 no longer contacts housing 16, thereby opening the switch and causing motor 22 to stop. In the preferred embodiment of the invention switch 20 is actuated at an intermediate point in the operation of the spring so that the motor is cut in before the spring reaches its extended position. This arrangement permits the spring to move the ammunition while the motor is coming up to speed. Roller clutch 21 between field 8 and housing 2 prevents springs 17 from rotating the sector in a clockwise direction to relieve compression in the spring. Accordingly, there is exerted upon the housing 2 and sprockets 4 a force equal to the amount spring 17 has been compressed. This results in a force being exerted upon the ammunition between the booster motor and the gun which is equal to the compression in the spring. When it is again desired to fire the gun, switch 23 is closed, resulting in immediate firing of the gun and positive actuation of the ammunition towards the gun through the operation of spring 17. When the force of the spring has been expended to the point that element 19 is engaged by portion 18 of housing 16 to close switch 20, electrical energy is again directed to motor 22 for driving housing 2 and sprockets 4.

As a result of this arrangement ammunition is boosted towards the gun as well as being pulled from the ammunition box, thereby avoiding any difficulty that may result from maneuvers of the airplane which might otherwise cause malfunction or stoppage of the gun.

Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is by way of illustration and example only and is not to betaken by way of limitation, the spirit and scope of this invention being limited only by the terms of the appended claims.

I claim:

1. An ammunition booster comprising a support, a sprocket rotatably mounted on said support, an electric motor having armature and field means, a clutch for drivingly connecting said armature to said sprocket, spring means connected at one end to said support and at the other end to said field, stops for limiting rotative movement of said field, and a clutch between said field and said sprocket.

2. An ammunition booster comprising a support, a

sprocket rotatably mounted on said support, a motor having an armature and a field, a clutch for drivingly connecting said armature to said sprocket, a spring connected at one end to said support and at the other end to said field, stops for limiting rotative movement of said field, and a clutch between said field and said sprocket.

3. A device as recited in claim 2 and further including a switch responsive to tensioning of said spring for controlling operation of said motor.

4. An ammunition booster comprising a support, a sprocket rotatably mounted on said support, an electric motor having armature and field means, means for drivingly connecting said armature to said sprocket, spring means connected at one end to said support and at the other end to said field, stops for limiting rotative movement of said field, clutch means connecting said field and said sprocket, a switch for controlling firing of said gun, a switch responsive to tensioning of said spring for controlling operation of said motor, and a time delay relay in series connection with said two switches whereby, upon operation of said first switch to cause said gun to cease firing, said motor continues to be energized to move said field, and tension said spring to exert a feeding force on said ammunition.

5. A booster for assisting in feeding a belt of ammunition to an automatic machine gun comprising: rotatably mounted sprocket means for engaging and feeding said ammunition; a motor comprising armature means and field means, one of said means being drivingly connected to said sprocket means and the other of said means being relatively movable with respect to both said first means and said sprocket means; means for limiting the movement of said other means, including a spring connected thereto; a clutch between said other means and said sprocket means; and means including a time delay relay

for continuing the energization of said motor after cessation of gun firing to compress said spring and means to hold said spring compressed during cessation of gun firing to thereby exert a feeding force on said ammunition upon release of said spring and commencement of gun firing.

6. In combination, an automatic gun, a booster for assisting in feeding a belt of ammunition to said gun including a support, a sprocket rotatably mounted on said support, a motor having a rotatable armature operatively connected to said sprocket and a relatively rotatable field, stops for limiting the rotative movement of said field, a spring connected at one end to said support and at the other end to said field for urging said field against one of said stops, clutch means between said field and said sprocket, a switch connected to said motor for controlling gun firing, and means including a time delay relay operatively connected to said switch for continuing motor operation after cessation of gun firing to urge said field against the other of said stop and compress said spring, and means for holding said spring compressed during cessation of gun firing to thereby exert a feeding force on said ammunition upon release of said spring and commencement of gun firing.

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