March 7, 1950 C. J. GROSS 2,499,497

TRIGGER CONTROL DEVICE

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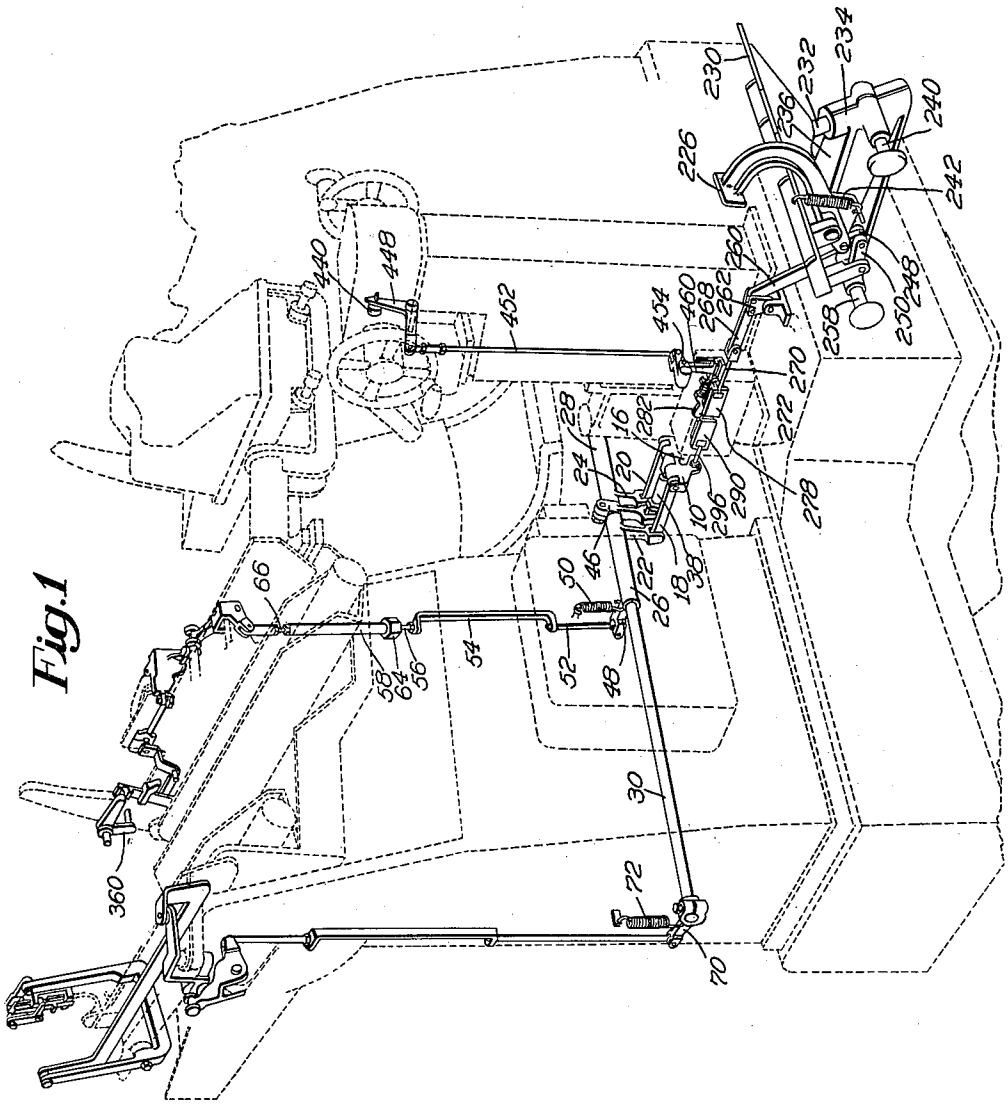


Fig. 1

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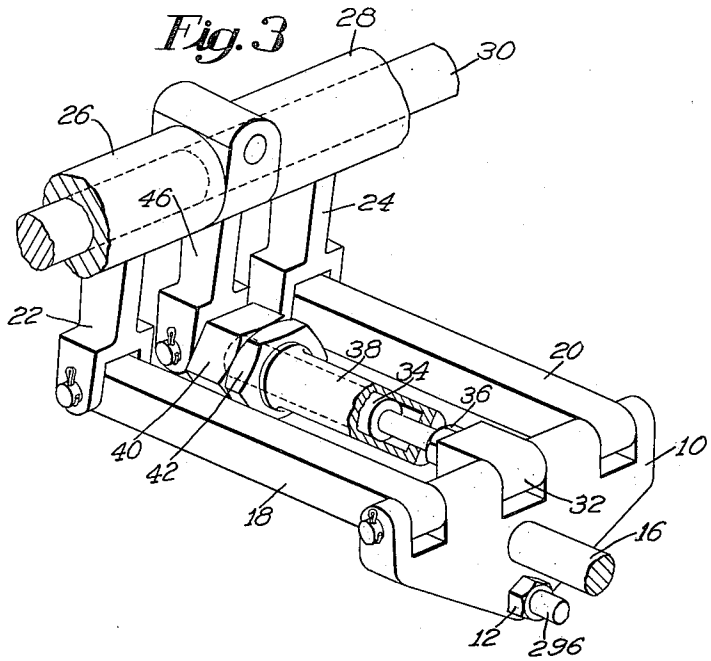
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Fig. 3



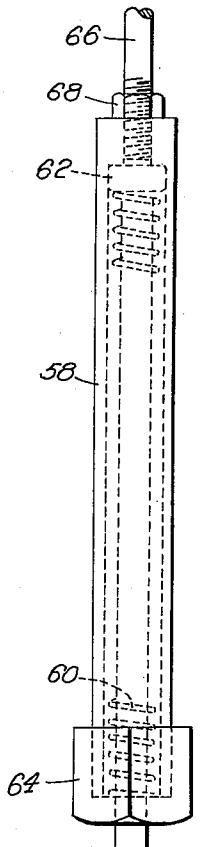
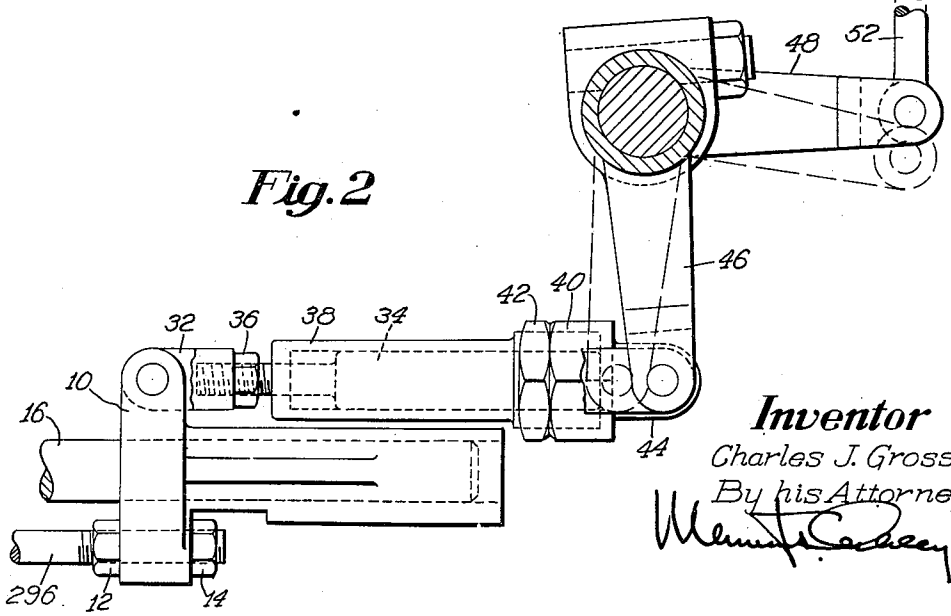


Fig. 2



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2,499,497

TRIGGER CONTROL DEVICE

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2 Claims. (Cl. 89—136)

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This invention relates to a trigger control device adapted particularly for use with a plurality of guns.

It is an object of the invention selectively to control the firing of a plurality of guns so that the desired number of guns may automatically be fired upon operation of a single member without requiring preparatory or supplemental actuation of any additional or special control part.

In accordance with a feature of the invention, therefore, connections are provided between the trigger operating means for each gun and an operator-controlled firing means and are arranged to be selectively rendered operative in response to the movement of the firing means.

For a complete understanding of the details of the invention, reference may be had to the following detailed description and to the drawings in which:

Fig. 1 is an angular front view of a gun mount provided with a trigger control device for selectively firing a plurality of guns;

Fig. 2 is a side view of a portion of the control device; and

Fig. 3 is an angular view of a portion of the control device.

The structure, i. e., the general organization of the gun mount illustrated in Fig. 1, is similar to the organization of the mount described in my Patent No. 2,486,526, granted November 1, 1949 to which patent reference may be had for a full description of said details. The present mount, however, is designed to support four guns instead of only two guns as disclosed in the aforementioned patent.

As fully described in my aforementioned patent, the guns are fired by movement of an operator-actuated pedal 226 (Fig. 1) which corresponds to the member designated by the same reference numeral in said patent. The parts of the mechanism illustrated in Figs. 1 to 3 of the drawings annexed hereto will, whenever they correspond to like parts described in my aforementioned patent, be designated by the same reference numerals previously used.

The pedal 226 is pivoted to a foot rest 230 which is secured to a post 232. In order to adjust the foot rest 230 heightwise to suit the convenience of the operator of the turret, the post 232 is adjustable in a split sleeve 234 integral with a bracket 236 secured to the mount. The post 232 and the foot rest 230 are held in adjusted position by means of a spring-pressed locking plunger 240 which is mounted in the sleeve 234 and engages in one of a plurality of bores (not shown) in the post 232.

The pedal 226, which normally is held in its initial or inoperative position by a spring 242 secured to the pedal and to the foot rest 230, has a rearward extension which is connected by a link 248 to a two-armed lever 250 pivoted between lugs on the foot rest 230. A spring-pressed plunger 256 serves to connect the lever 250 to the lower end of a link 260, the plunger engaging in one of a series of holes in the link, the holes corresponding in number to the number of bores in the post 232. Whenever the foot rest 230 is adjusted heightwise, the link 260 must be adjusted correspondingly in order that the leverage between the foot rest and the link will not be disturbed.

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A rocker 262, pivoted to the mount, and a link 268 serve to connect the link 260 with a horizontal rod 270 which extends into a trigger lock housing 272 secured to the mount. The rod 270 is joined to a slide 278 mounted to reciprocate in the housing 272. Pivotally mounted on the slide 278 is a spring-pressed pawl 282 which normally engages a pawl (not shown) pivoted on a slide 290 also mounted for reciprocating movement in the trigger lock housing 272.

Joined to the slide 290 is a rod 296 which extends beyond the trigger lock housing 272. The outer end of the rod 296 is provided with screw threads and is secured in a control slide 10 (Fig. 2) by lock nuts 12, 14. The slide 10 comprises a part of the means for successively firing the guns upon operation of the pedal 226 and is mounted to move horizontally on a shaft 16 extending rearward from the trigger lock housing 272. There are pivoted to the slide 10 two outer links 18, 20 (Fig. 3) which serve to transmit the motion of the pedal 226 and the slide 10 to a selected number of guns, as illustrated to the inner guns, to fire them, as will be described more in detail below. The links 18, 20 are also pivotally joined to the bifurcated ends of lugs 22, 24 integral with sleeves 26, 28 rotatably mounted on a shaft 30 which oscillates in standards formed on the mount.

Pivotally joined to the slide 10 between the links 18, 20 is a connection 32 into which is threaded the reduced end of a plunger 34, a check nut 36 preventing relative movement of the reduced plunger end and the connection 32. The plunger 34 is so mounted for movement in a plunger housing 38 as to permit a movement of the plunger relative to the housing, this relative movement being a lost motion. The plunger, upon taking up of the lost motion, then serves to transmit the movement of the slide 10 to another series of guns, as illustrated to the outer guns, through the housing 38, in order to fire said guns. A cap 40 is threaded onto the end of the housing 38 to form a closure therefor and is held locked in position by a nut 42. A lug 44 on the cap 40 is pivotally connected to the bifurcated end of a lever 46 which is clamped to the shaft 30 between the sleeves 26, 28.

Movement of the slide 10 is transmitted to the guns of the mount through the above described connections in the following manner. Since the

sleeves 26, 28 serve to transmit actuating movements to the triggers of the guns controlled by them through identical connections, only one set of connections is illustrated in Fig. 1, it being understood that identical connections lead to the other gun controlled thereby. The sleeve 26 has integral therewith a rearward extension 48 to which is joined one end of a spring 50, the other end of which is secured to the mount, the spring serving to hold the sleeve 26 in its initial position. Pivotally joined to the extension 48 is a vertical rod 52 which, through a yoke 54, is connected to a rod 56 (Fig. 2) arranged to move vertically in a cylindrical housing 58. Surrounding the rod 56 within the housing 58 is a spring 60 one end of which engages a head 62 on the rod 56 and the other end of which engages a cap 64 attached to the lower end of the housing 58. Threaded into the upper end of the housing 58 is a rod 66 which is held against movement relative to the housing by a nut 68. The rod 66, through a train of connections, is joined to a trigger bell crank 360 which acts on the trigger of the gun and thus serves to operate the firing mechanism of the gun. The bell crank 360 and its train of operating parts comprise the trigger operating means for the gun.

The shaft 30 is oscillated by the slide 10, when the lost motion between the plunger 34 and the housing 38 has been taken up, to operate the firing mechanism of the outer guns through trains of parts only one of which is illustrated in Fig. 1. Secured to the outer end of the shaft 30 is a lever 70 to which is connected one end of a spring 72, the other end of which is attached to the mount, the spring 72 serving to hold the shaft 30 in its initial position. The lever 70, through a series of connecting parts, operates the firing mechanism of its gun in a manner fully disclosed in my aforementioned patent.

It may be desirable, at times, to disconnect the firing pedal from the trigger operating mechanism, for example, to insure against accidental firing of the guns before the gunner is ready to commence firing, in a manner fully described in my previous patent. For this purpose, there is provided a plunger 440 (Fig. 1) arranged to engage in one of two openings, corresponding to "fire" and "safe" positions, in a plate (not shown). The plunger is joined to a bell crank lever 448 which, through a pull rod 452 and a rocker lever 454, is connected to a slide 460 vertically movable in the trigger lock housing 272 and arranged, when the plunger is moved to "safe" position, to swing the pawl 282 out of engagement with the other pawl (not shown), thus breaking the connection between the firing pedal and the trigger mechanism. When the plunger 440 is in "fire" position, the aforementioned pawls are in engagement and depression of the pedal 226 will serve to fire the guns.

The trigger control device is operated in the following manner. The operator depresses the pedal 226 and, through the lever 250, the link 260, and the slides 278, 290, moves the control slide 10 forward on the shaft 16. Movement of the slide 10 rotates the sleeves 26, 28 through the links 18, 20, this rotary movement being transmitted through the rods 52 and the yokes 54 to the rods 56 which, in turn, move the housings 58 downward, swinging the trigger bell cranks 360 through the connecting parts to operate the firing mechanisms of the corresponding (inner) guns.

During the initial movement of the slide 10 and the links 18, 20, effecting firing of the inner guns, as described, the plunger 34 moves in the housing 38, effecting a lost motion, until its forward end engages the front end of the housing. Thereafter, upon continued depression of the pedal 226, the shaft 30 will be rotated by the slide 10 and the lever 46, the springs 60 now yielding as the links 18, 20 continue to move with the slide 10. The rotary movement of the shaft 30 is transmitted to the levers 70 and through the connecting parts to the trigger bell cranks of the outer guns, firing these guns. It is obvious, therefore, that the operator by depressing the pedal 226 may fire a selected number of guns. As illustrated, he may first fire the two inner guns and then by continued depression of the pedal 226, fire both the inner and the outer guns. If he desires, he may defer the firing of the outer guns until the ammunition for the inner guns has been exhausted and then fire the outer guns by further depression of the pedal 226. When the pedal is released, the springs 242, 50, and 72 act to return the parts to their initial positions.

Having thus described my invention, what I claims as new and desire to secure by Letters Patent of the United States is:

1. In a trigger control device for a plurality of guns each having a trigger for firing the gun, trigger operating means for the trigger of each gun, a movable firing means for actuating the trigger operating means, yieldable connections between a selected number of the trigger operating means and the firing means for actuating said trigger operating means upon the initial movement of the firing means, and a connection having a lost motion between another selected number of the trigger operating means and the firing means whereby the lost motion may be taken up during said initial movement of the firing means so that the last-named number of trigger operating means may be actuated upon further movement of the firing means.

2. In a trigger control device for a plurality of guns, trigger operating means for each gun, an operator-actuated pedal for actuating the trigger operating means and means between the pedal and the trigger operating means for causing said trigger operating means to be actuated in predetermined order, said means comprising a slide movable horizontally to actuate two series of connections one of which includes links, sleeves oscillated by the links, and yieldable transmitting parts for operating a selected number of triggers and the other of which includes a plunger housing and a plunger having a lost motion in the housing, a lever pivoted to the housing, a shaft oscillated by the lever, and transmitting means between the shaft and another selected number of triggers.

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