

March 10, 1925.

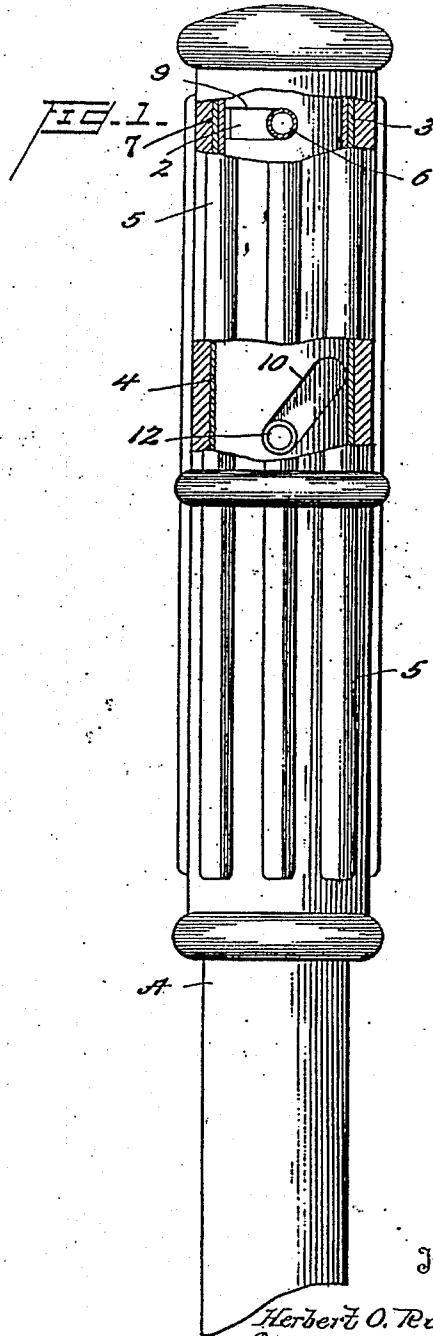
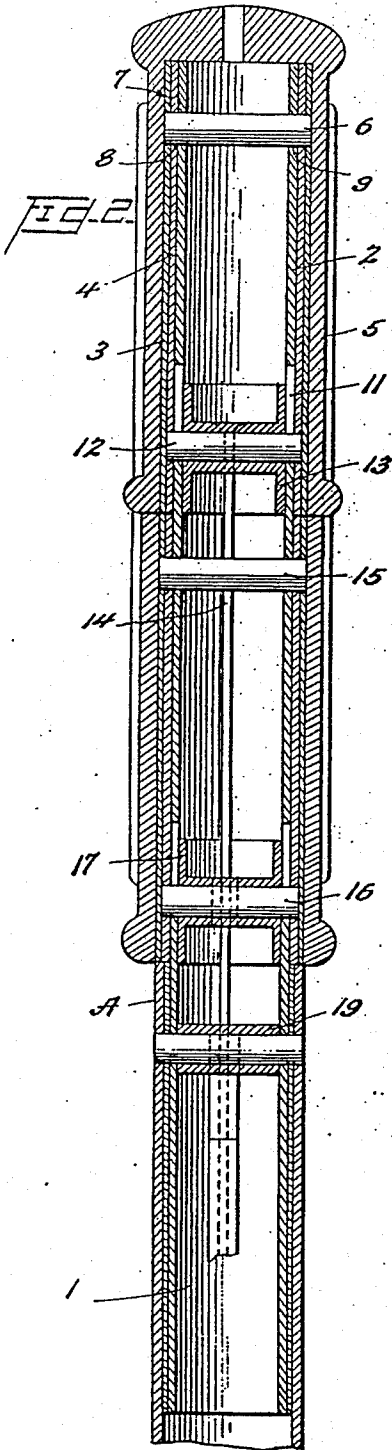
H. O. RUSSELL ET AL

1,528,952

SYNCHRONIZED GUN CONTROL

Filed April 18, 1922

2 Sheets-Sheet 1



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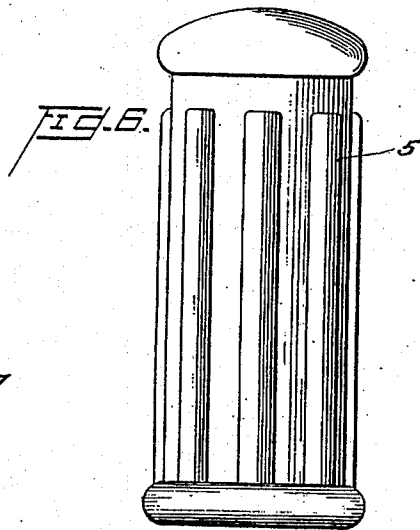
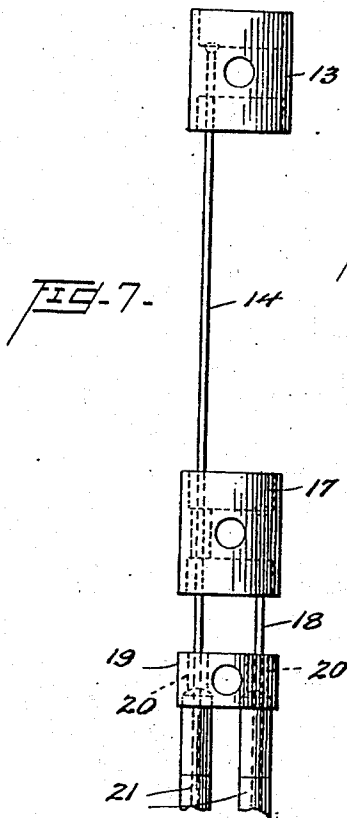
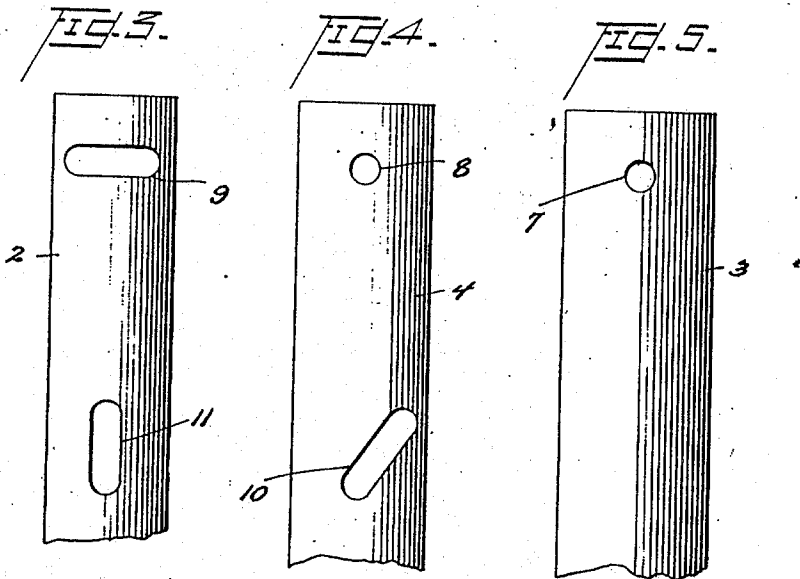
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# UNITED STATES PATENT OFFICE.

HERBERT O. RUSSELL, OF DETROIT, MICHIGAN, AND CHARLES LEIGH PAULUS, OF DAYTON, OHIO.

## SYNCHRONIZED GUN CONTROL.

Application filed April 18, 1922. Serial No. 553,417.

*To all whom it may concern:*

Be it known that we, HERBERT O. RUSSELL and CHARLES LEIGH PAULUS, citizens of the United States, residing, respectively, at Detroit and Dayton, in the counties of Wayne and Montgomery and States of Michigan and Ohio, have invented certain new and useful Improvements in Synchronized Gun Controls, of which the following is a specification.

This invention relates to synchronized gun control mechanism especially adapted for use upon and in conjunction with the control or joy stick of an airplane.

The object of the invention is to equip the joy stick of any type of aircraft with separate and independently operable hand grips so mounted and connected with the firing mechanism of a plurality of machine guns that one or more guns may be fired at a time. In other words the operator may selectively control the guns or collectively fire them.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement herein fully described, illustrated and claimed.

In the accompanying drawings:

Figure 1 is a fragmentary side elevation of a joy stick, showing the control mechanism in its applied relation thereto.

Figure 2 is a diametrical section through same at right angles to the plane of Figure 1.

Figure 3 is a fragmentary detail view of the inner tube.

Figure 4 is a similar view of the intermediate tube.

Figure 5 is a similar view of the other tube.

Figure 6 is a similar view of one of the hand grips.

Figure 7 is a sectional view taken at a right angle to Figure 2, showing the arrangement of sliding and fixed blocks.

Referring to the drawings:

A designates generally the joy stick or control stick of an airplane. In the preferred embodiment of the invention the joy stick is of tubular formation as shown at 1, so that the gun control cables may pass through same.

2 designates an inner tube which is co-extensive in length with the combined length of the hand grips and it extends beyond or

below the hand grips for a purpose which will appear. Surrounding the inner tube 2 are a plurality of other tubes 3 which are capable of independent rotative movement around the inner tube 2. Inside of each outer tube 3 and surrounding the inner tube 2 is an intermediate tube 4. Each outer tube 3 has a hand grip 5 mounted thereon and preferably cemented or otherwise fastened thereto.

A pin 6 extends diametrically through oppositely located holes 7 in the outer tube 3, also through diametrically opposite holes 8 in the intermediate tube 4, and also through transverse slots 9 in the inner tube 3.

Each intermediate tube is formed with oppositely located spiral slots 10 and the inner tube, at corresponding points, is provided with opposite longitudinal slots 11. A pin 12 extends through the slots 10 and 11 so that when a partial rotative movement is given to the intermediate tube 4, pin 12 will travel longitudinally on the slots 11. As the pin 12 passes through a cylindrical sliding block 13 inside of the inner tube 2, said block will be moved in a corresponding direction. One of the gun operating cables 14 is fastened to the block 13 as shown.

In like manner the next lower hand grip 5, with its outer tube 3, is connected by a pin 15 to the respective intermediate tube 4 and the inner tube 2. Also the tube 3 is connected with the tubes 4 and 2 by means of a pin 16 which passes through a second sliding block 17 within the inner tube 2. Connected to the sliding block 17 is another gun operating cable 18.

Arranged at a lower point in the inner tube 2 is a fixed guide block 19 having guide holes 20 through which the cables 14 and 18 slide. The block 19 also forms an anchoring block for the flexible casings 21 of the cables 14 and 18. The casings and cables extend to the trigger motors of the machine guns which are thus independently controlled by hand grips 5. It will be observed that the hand grips are arranged close together and end to end so that they may be simultaneously grasped in the hand and simultaneously turned so as to fire more than one gun at a time.

Having thus described our invention, we claim:

1. In synchronized gun control, a control stick of an aircraft embodying an inner tube

having a longitudinal slot, an outer grip-operated tube adapted to be rotated relatively to said inner tube, an intermediate tube rotated by said outer tube having a spiral slot, and a gun-controlling cable-operating block slidable longitudinally within said inner tube and having a pin which works in said longitudinal and spiral slots.

2. In synchronized gun control, a control stick of an aircraft embodying an inner tube having a plurality of longitudinal slots, a plurality of outer grip-operated tubes adapted to be rotated relatively to said inner tube, a plurality of intermediate tubes rotated by said outer tube having spiral slots, and a plurality of gun-controlling cable-operating blocks slidable longitudinally within said inner tubes and each having a pin working in opposite longitudinal slots of the inner tube and in opposite spiral slots of the respective outer tube.

3. In synchronized gun control, a control stick of an aircraft embodying an inner tube having a plurality of longitudinal slots,

a plurality of outer grip-operated tubes adapted to be rotated relatively to said inner tube, a plurality of intermediate tubes rotated by said outer tube having spiral slots, and a plurality of gun-controlling cable-operating blocks slidable longitudinally within said inner tubes and each having a pin working in opposite longitudinal slots of the inner tube and in opposite spiral slots of the respective outer tube, and a fixed guide block in the inner tube forming a support for the cable casings.

4. In a synchronizing gun control, a control stick having embodied therein a plurality of relatively movable tubes, a portion of said stick being rotatable about its longitudinal axis for imparting movement to said tubes and gun control means in connection with certain of said tubes.

In testimony whereof we affix our signatures.

HERBERT O. RUSSELL.  
CHARLES LEIGH PAULUS.