July 3, 1923. 1,460,420

B. P. JOYCE

COUNTERPOISE

Filed May 7, 1923 2 Sheets-Sheet 1

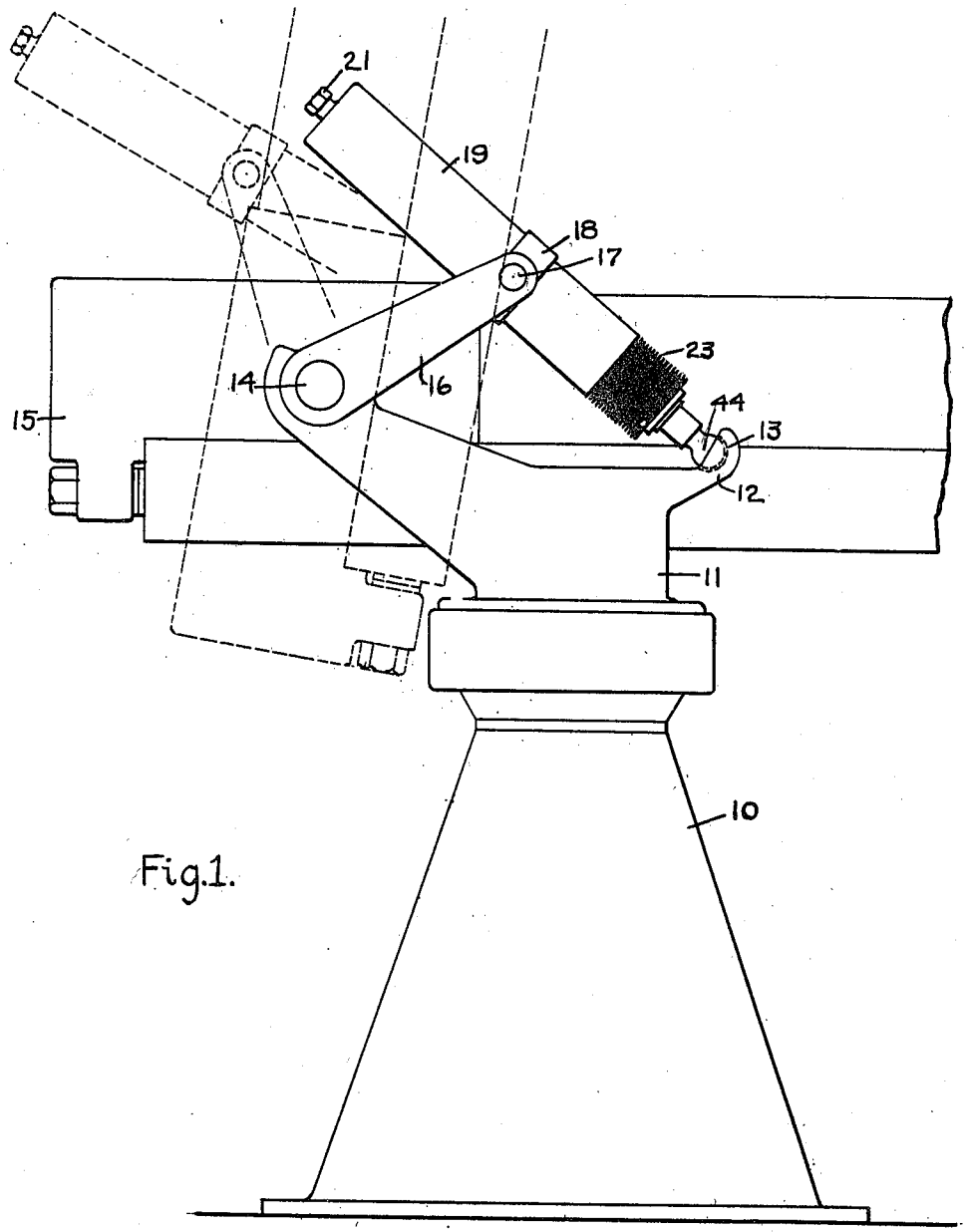


Fig.1.

Inventor

BRYAN P. JOYCE.

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July 3, 1923.

1,460,420

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2 Sheets-Sheet 2

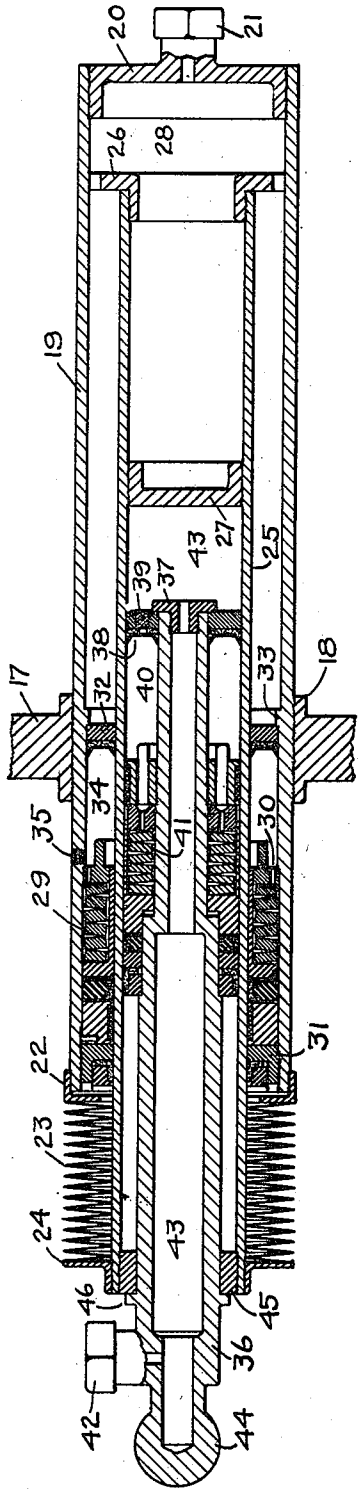


Fig.2.

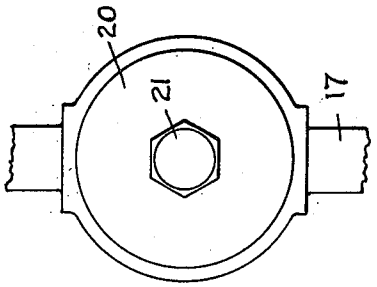


Fig.4.

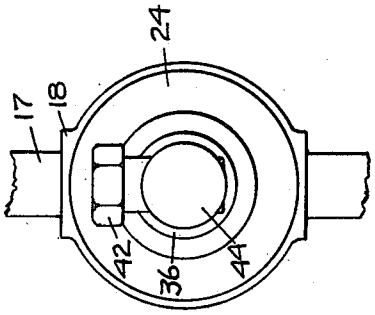


Fig.3.

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Patented July 3, 1923. 1,460,420

UNITED STATES PATENT OFFICE.

BRYAN P. JOYCE, OF DAVENPORT, IOWA.

COUNTERPOISE.

Application filed May 7, 1923. Serial No. 637,244.

(FILED UNDER THE ACT OF MARCH 3, 1883, 22 STAT. L., 625.)

To all whom it may concern:

Be it known that I, BRYAN P. JOYCE, a citizen of the United States, and a resident of Davenport, county of Scott, and State of Iowa, have invented an Improvement in Counterpoise, of which the following is a specification.

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment to me of any royalty thereon, in accordance with the act of March 3, 1883.

The subject of this invention is a counterpoise intended, primarily, for use on guns susceptible of high elevation, though not restricted to such use.

The main object of the invention is the provision of a counterpoise, the force exerted by which will vary as the part which it is counterbalancing is rocked about its axis, the variation in such force being approximately proportional to the variations in the force exerted by the gravity tending to turn the counterbalanced part about its axis.

A further object of the invention is the provision of a simple and efficient counterpoise.

With the foregoing and other objects in view, my invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A practical embodiment of my invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a view in side elevation of a gun mount with a counterpoise constructed in accordance with my invention in place thereon, a fragment of the gun being shown on the mount; the elevated position of the gun and the position assumed by the counterpoise when the gun is in elevation being indicated in dotted lines;

Fig. 2 is a longitudinal section of the counterpoise;

Fig. 3 is a lower end elevation of the counterpoise; and

Fig. 4 is a head end elevation.

Referring to the drawings by numerals of reference:

In carrying out my invention I provide a gun mount 10, having an upper carriage 11 formed with a bracket 12 in which is provided a recess 13, preferably hemispherical.

In the upper carriage the trunnions 14, only one of which is shown, about which the gun 15 oscillates when elevated are journaled, and rigidly secured to each trunnion are arms 16 the outer ends of which are apertured to receive trunnions 17 extending from a trunnion band 18, which is secured to a counterpoise casing 19 the upper end of which is closed by a head 20, provided with a valve 21, through which fluid under pressure, conveniently compressed air, may be admitted to the interior of the counterpoise casing. The lower of the casings has secured thereto an apertured head 22 to which is fastened one end of a collapsible tubing 23, the other end of which is secured to an apertured disk 24 which disk is fastened to a tubular plunger 25 which is reciprocable within the casing. The purpose of the collapsible tube 23 is to protect the plunger 25 from dust and other foreign substances. The plunger 25 has secured to its inner end an apertured head 26 and at a suitable point within the plunger is secured a diaphragm 27, thus providing a compressed air chamber 28 between the diaphragm 27 and a suitable grease seal.

The grease seal is preferably formed by providing a packing ring carrying the packing 29 and having apertures 30 formed therein through which grease may pass about the packing to properly lubricate the same, the packing being preferably held in place by the ring 31 which is secured in the lower end of the casing 19. A packing ring 32 rests against an annular rib 33 formed in the casing 19 and provides the other wall of the grease chamber 34 into

which grease may be forced through an aperture closed by a screw plug 35.

Movement of the plunger with respect to the casing is limited by the head 26 coming in contact with the annular rib 33.

Within the tubular plunger 25 is located a second plunger 36, said plunger being hollow and open at its inner end in which end is secured the apertured plug 37 flanged to extend beyond the plunger and overlie a packing 38 which is provided with an aperture normally closed by a screw plug 39 through which aperture grease may be forced to a grease chamber 40 formed between the plungers 25 and 36 and the packing ring 38 and a packing 41. Fluid under pressure, conveniently compressed air, may be forced through a valve 42 into the chamber 43 formed in the hollow plunger 36 and the space between the packing 38 and the diaphragm 37 of the hollow plunger 25. The projecting end of the plunger 36 is of spherical formation to be received in the recess 13 of the bracket 12 in which it will have a slight rocking movement. The plunger 36 is guided in its movement by the packing and also by a ring 45 which surrounds this plunger and is secured in the lower end of the plunger 25. When the plunger 36 is moved to its innermost position within the plunger 25 a flange 46 formed on the plunger contacts this ring 45 and so limits the movement of the plunger 36 with respect to the plunger 25 and also forms a support for the plunger 25 when respective movement takes place between the plunger 25 and the casing 19.

I claim:

1. The combination with a gun carriage having a bracket provided with a socket and a trunnion journaled in the carriage, of arms secured to the trunnion, a hollow casing, trunnions secured to the casing and journaled in the arms, a hollow plunger slidable in the casing, a diaphragm secured in the hollow plunger, the spaces between the diaphragm, plunger and the casing forming an air chamber, packing between the casing and plunger forming a grease seal chamber, a second hollow plunger within the first plunger, the hollow portion of said second plunger in communication with the interior of the first plunger to provide an air chamber, packing between the plungers forming a grease seal chamber and an end on the second plunger formed to seat in the socket.

2. The combination with a gun carriage having a bracket provided with a socket and a trunnion journaled in the carriage, of arms secured to the trunnion, a hollow casing, trunnions secured to the casing and journaled in the arms, a plunger slidable within the casing and forming therewith a chamber for fluid under pressure, a second plunger slidable within the first plunger and forming therewith a chamber for fluid under pressure and an end on the second plunger to engage the socket for pivotal movement therein.

3. The combination with a gun carriage having a bracket provided with a socket and a trunnion journaled in the carriage, of arms secured to the trunnion, a hollow casing, trunnions secured to the casing and journaled in the arms, fluid pressure actuated plungers reciprocable within the casing, the mean effective pressure of the fluid on the plungers varying to cause the plungers to act successively and an end formed on one of the plungers seated in the socket for oscillation therein.

4. The combination with a gun carriage provided with a socket and a trunnion journaled in the carriage, of arms secured to the trunnion, a casing, trunnions carried by the casing and journaled in the arms, successively movable plungers within the casing and an end on one of the plungers seated in the socket for oscillatory movement therein.

BRYAN P. JOYCE.