May 17, 1932. B. P. JOYCE 1,858,829

COUNTERPOISE MECHANISM

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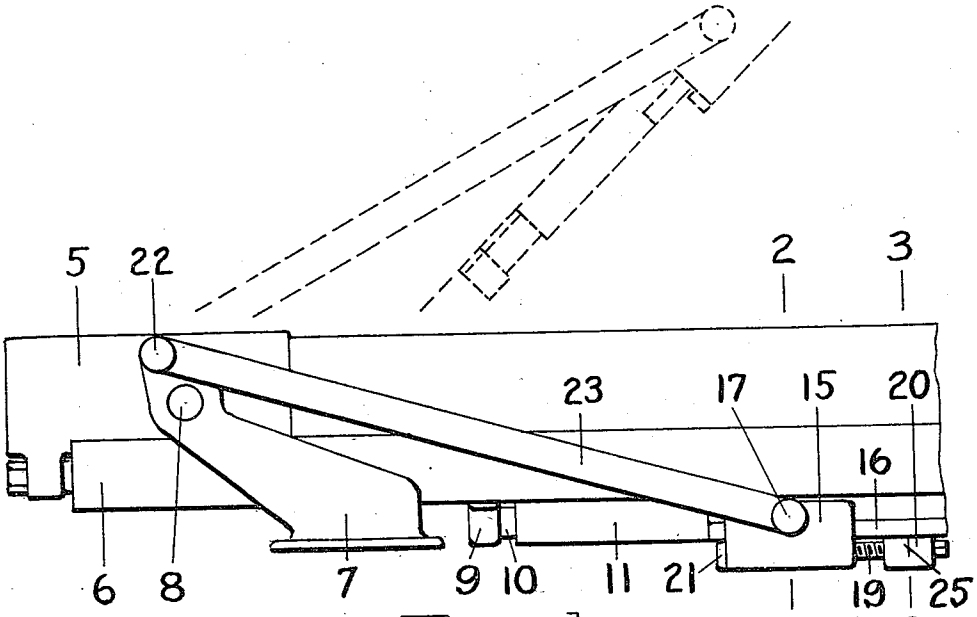


Fig. 1.

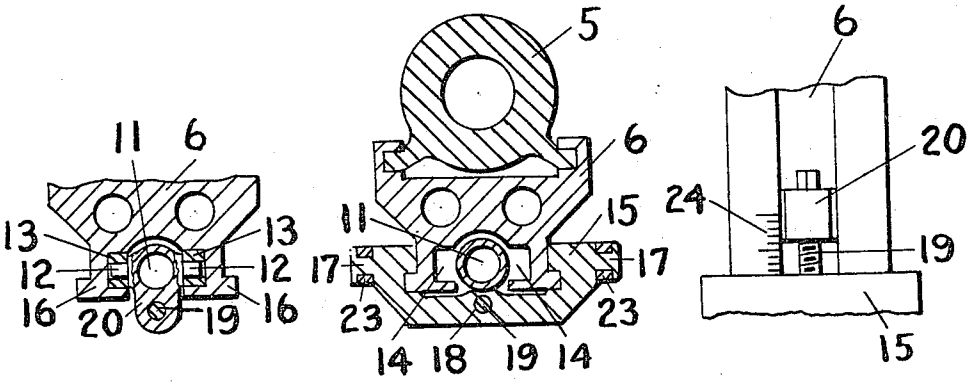


Fig. 3. Fig. 2. Fig. 4.

INVENTOR

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COUNTERPOISE MECHANISM

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The subject of this invention is a counterpoise mechanism intended for use with pivotally mounted bodies but more especially for use with guns.

Among the objects of this invention are to permit the use of but one counterpoise per gun; to permit the use of a pneumatic counterpoise with but one packing; to provide adjustment for a spring counterpoise to compensate for age and use or variations in manufacture; to provide adjustment for a pneumatic counterpoise to compensate for change in temperature; to provide a counterpoise mechanism which does not increase the height of a gun carriage or gun mount; and such further objects, advantages and capabilities as will hereinafter appear and as are inherent in the construction disclosed. My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now considered the preferred embodiment of this invention, I desire it understood that the same is to be construed as illustrative only and not to be interpreted in a limiting sense.

It is the present practice to use two counterpoise per gun, one arrangement being disclosed by Patent No. 1,460,420, dated, July 3, 923. With such an arrangement the counterpoise project above the gun, while for purposes of both transport and emplacement it is desirable that all parts be kept as low as possible. The compression type of pneumatic counterpoise such as disclosed by Patent No. 1,460,419, dated, July 3, 1923, costs less and has less friction than a tension type pneumatic counterpoise. Tension type counterpoise have been used to reduce the height of the counterpoise mechanism. The present invention while keeping the height of the counterpoise mechanism at a minimum uses a compression type counterpoise.

Generally, pneumatic counterpoise require an adjustment such as disclosed by Patent No. 1,602,113, dated, Oct. 5, 1926, to compensate for change in temperature. The present practice is to provide two adjustments, one for each counterpoise. The present invention requires but one adjustment.

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

Fig. 1 is a view in side elevation of a gun equipped with my counterpoise mechanism, the position of the mechanism when the gun is in elevation being shown in dotted lines.

Fig. 2 is a cross section taken on the line 2—2, Fig. 1.

Fig. 3 is a fragmentary cross section taken on the line 3—3, Fig. 1.

Fig. 4 is a fragmentary bottom view at the line 3—3, Fig. 1.

Referring more in detail to the annexed drawings, the gun 5 with its cradle 6 is mounted in the top carriage 7 by means of the trunnions 8. The cradle carries a bracket 9 in which a counterpoise plunger 10 is fixed. The counterpoise casing 11 is provided with axles 12 which carry the rollers 13, the rollers engaging the slots 14 in the cradle. The yoke 15 is free to slide on the guides 16 on the cradle and is provided with pivots 17 and the hole 18. A bolt 19 is threaded into the bracket 20 from the counterpoise casing 11 and passing through the hole 18 in the yoke 15 carries the yoke with the counterpoise casing by means of the bolt head 21. Pivots 22 are provided in the top carriage to receive the upper ends of the tension members 23 while the lower ends of these members are attached to the pivots 17 on the yoke 15.

The counterpoise shown is of the pneumatic compression type such as disclosed in Patent No. 1,460,419 and usually requires an adjustment to compensate for changes in temperature. In the mechanism shown in the drawings the bolt 19 provides such adjustment and the scale 24 may be graduated in degrees of temperature to register against the index mark 25 on the bracket 20.

When a spring counterpoise is used the bolt 19 may be used to adjust for age and use as well as to correct for variations in manufacture.

While, for the reasons stated above, a compression type counterpoise is preferred, a tension type counterpoise may be used with the present invention. When a tension type counterpoise is used, the bracket 9 is placed

forward of the mechanism and receives the piston rod of the counterpoise, the other parts of the mechanism remaining as shown by the drawings.

From the drawings it is apparent that the effort of the counterpoise tends to lift the tipping parts of the gun into elevation and, the center of gravity of the tipping parts being located forward of the trunnions 8, the weight of the tipping parts opposes such lift. The effort of the counterpoise and the position of the tension members 23 with respect to both the counterpoise and the trunnions 8 are so related as to balance, in all positions of elevation, the weight of the tipping parts acting about the trunnions 8.

While I have shown and described a certain specific embodiment of my invention, it is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:

1. The combination with a top carriage including a gun and cradle trunnioned therein; of a counterpoise secured to said cradle, the plunger of said counterpoise being fixed to the cradle and the counterpoise casing having means engaging slots in said cradle and being free to reciprocate in said slots, a yoke slidably mounted on guides on the cradle and free to reciprocate with said counterpoise casing, a bracket from the counterpoise casing, a screw with a head engaging said bracket and the yoke, a pivot on the yoke at each side of the cradle, a pivot in the top carriage above each of the main trunnions, a tension member at each side of the cradle connecting a yoke pivot with a top carriage pivot and graduations on the cradle indicating the position of the counterpoise casing.

2. The combination with a top carriage including a gun and cradle trunnioned therein; of a counterpoise mounted on said cradle, a tension member at each side of the cradle, one end of said tension members being pivoted in the top carriage and the other end being pivoted to means engaging said counterpoise and said means including adjusting means whereby the effort of the counterpoise may be varied.

3. The combination with a top carriage including a gun and cradle trunnioned therein; of a counterpoise mounted on said cradle, a tension member at each side of the cradle and one end of said tension members being pivoted in the top carriage and the other end being pivoted to means engaging said counterpoise.

4. The combination with a top carriage including a gun and cradle trunnioned therein; of a pneumatic counterpoise of the compression type mounted on said cradle, a tension member at each side of the cradle, one end of said tension members being pivoted in the top carriage above the cradle trunnions and the other end being pivoted to means engaging said counterpoise and means permitting adjustment for changes in temperature.

5. The combination with a top carriage including a gun and cradle trunnioned therein; of a pneumatic counterpoise mounted on said cradle, a tension member at each side of the cradle and one end of said tension members engaging the top carriage and the other end being secured to means engaging said counterpoise.

6. The combination with a top carriage including a gun and cradle trunnioned therein; of a counterpoise reciprocatingly mounted on said cradle, a tension member at each side of the cradle and one end of said tension members being pivoted in the top carriage above the cradle trunnions and the other end being secured to means engaging said counterpoise.

7. The combination with a top carriage including a gun and cradle trunnioned therein; of a counterpoise reciprocatingly mounted on said cradle, a tension member at each side of the cradle, one end of said tension members being pivoted in the top carriage above the cradle trunnions and the other end being pivoted to means engaging said counterpoise and means whereby the counterpoise effort may be varied.

8. The combination with a top carriage including a gun and cradle trunnioned therein; of a single column counterpoise reciprocatingly mounted on said cradle, a tension member at each side of the cradle and one end of said tension members being pivoted in the top carriage and the other end being pivoted to means engaging said counterpoise.

BRYAN P. JOYCE.