

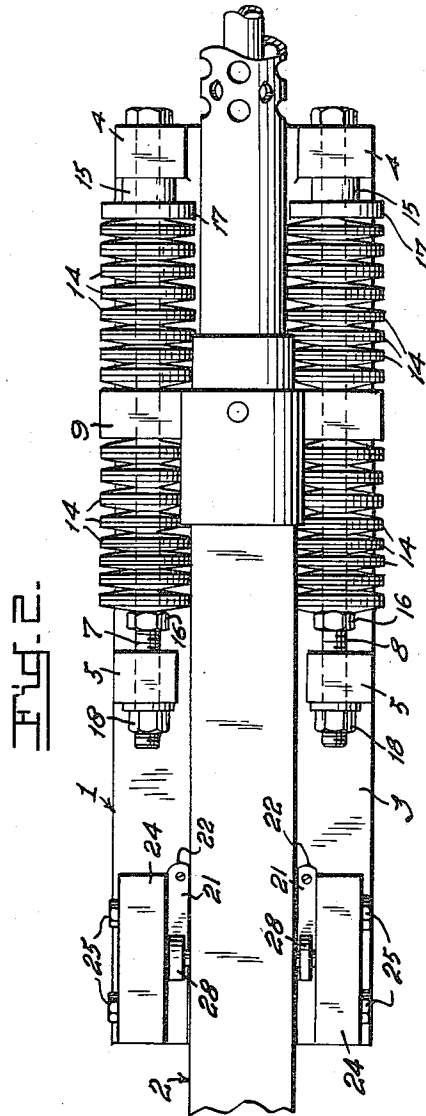
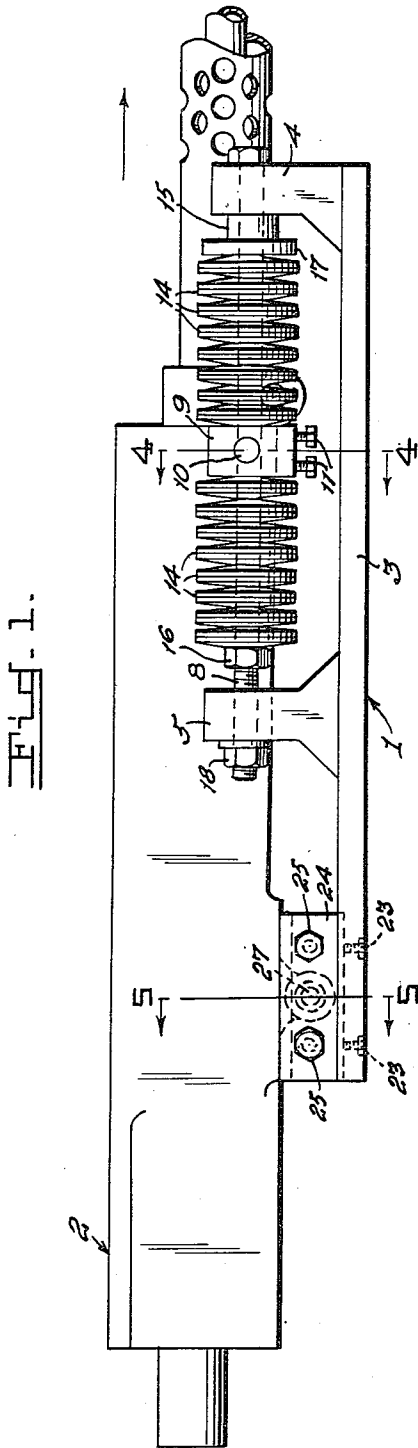
Feb. 15, 1955

C. E. BALLEISEN ET AL
EXPERIMENTAL MACHINE GUN MOUNT

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3 Sheets-Sheet 1



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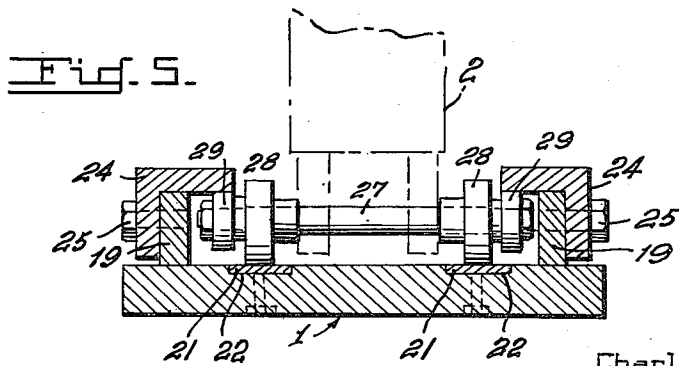
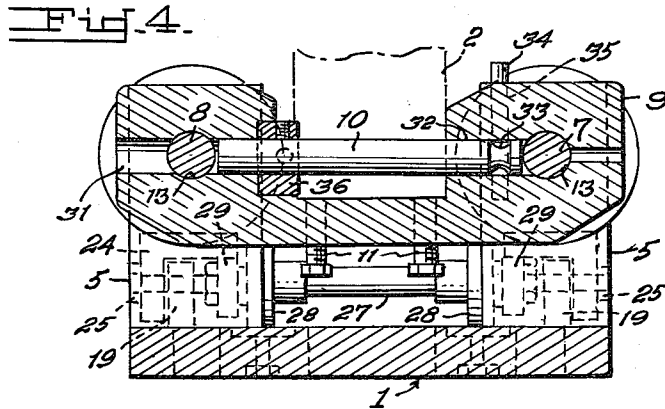
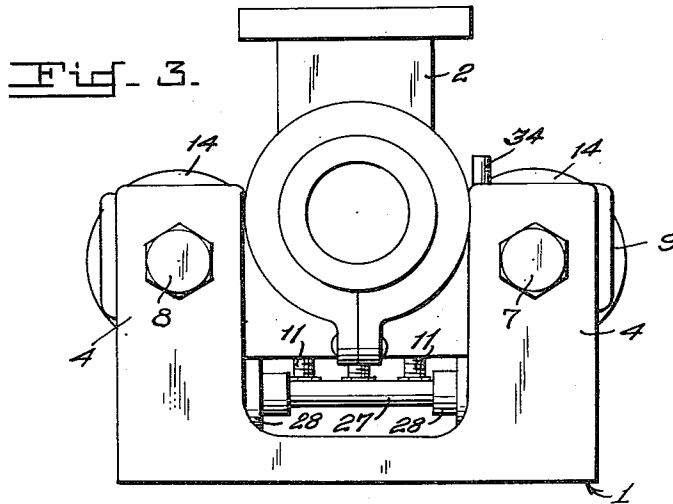
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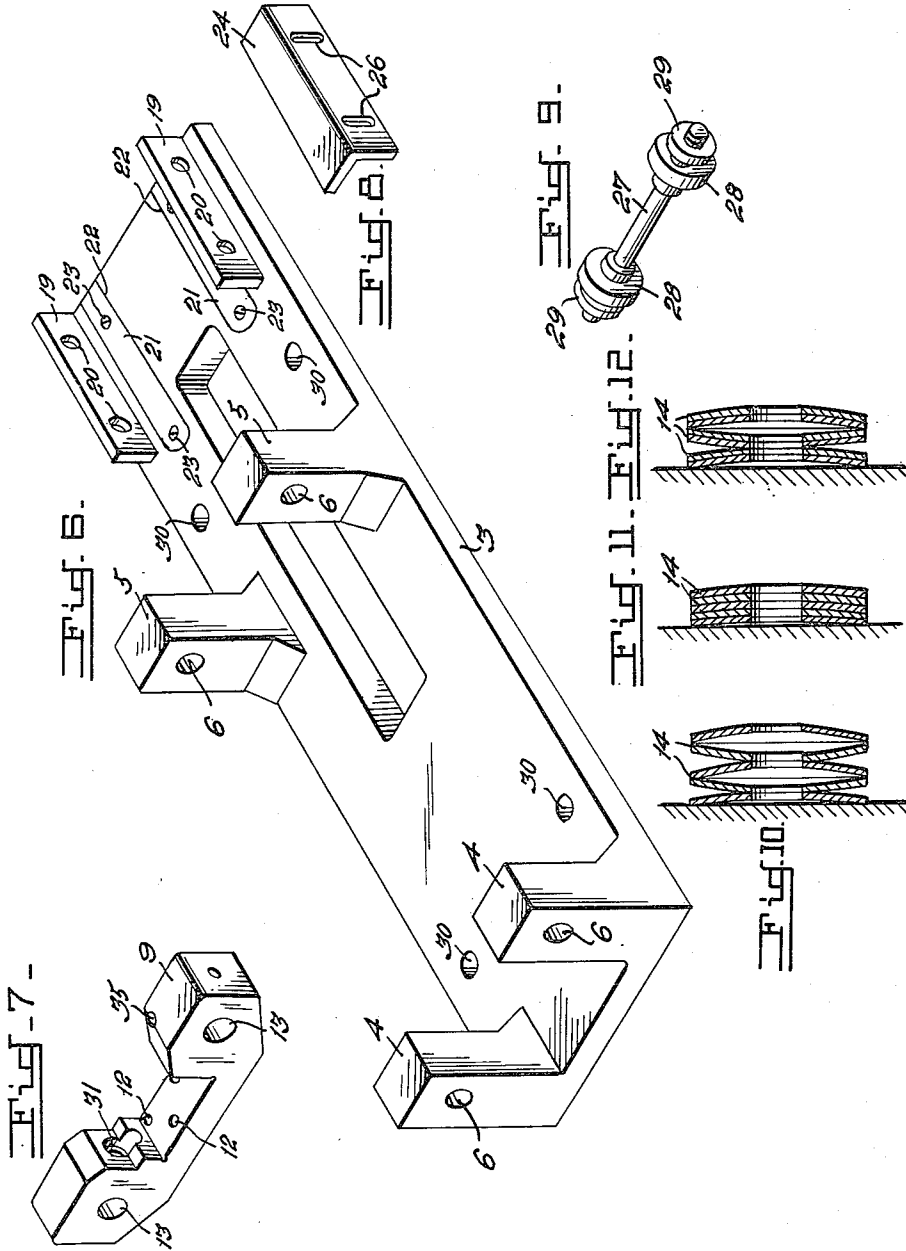
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EXPERIMENTAL MACHINE GUN MOUNT

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7 Claims. (Cl. 73—167)

(Granted under Title 35, U. S. Code (1952), sec. 266)

This invention relates to an experimental machine gun mount, and more particularly to a mount used in study of the performance of a machine gun in response to mounting conditions.

It is a principal object of this invention to provide an experimental machine gun mount to study the effect of vibration frequency of the mount on the rate of gunfire.

Another object of the invention is to provide an experimental machine gun mount in which the vibration frequency and amplitude can be varied to obtain the highest rate of fire from the gun.

A still further object is to provide an experimental gun mount of simplified and lightweight construction throughout.

The specific nature of the invention as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Figure 1 is a side elevation of the invention with a machine gun mounted therein for testing,

Figure 2 is a top plan view thereof,

Figure 3 is a front elevation of the device,

Figure 4 is a cross sectional view taken along the line 4—4 of Figure 1 and looking in the direction of the arrows,

Figure 5 is a cross sectional view taken along line 5—5 of Figure 1, looking in the direction of the arrows,

Figure 6 is a perspective view of the fixed mount member,

Figure 7 is a perspective view of the crosspiece member,

Figure 8 is a perspective view of one of the angle pieces,

Figure 9 is a perspective view of the roller assembly,

Figure 10 is a view in section illustrating Belleville springs arranged in series,

Figure 11 is a similar view, the springs being arranged in parallel, and,

Figure 12 is a similar view showing the springs arranged in series parallel.

Referring more particularly to the drawing, wherein like reference characters designate like or corresponding parts throughout the different views, reference character 1 indicates generally the gun mount assembly in its entirety. A machine gun 2 is mounted upon the assembly 1, as best seen in Figure 1. The gun mount per se comprises a base plate or fixed mount member 3, Figure 6, comprising an elongated flat platform, having a pair of laterally spaced forwardly-disposed posts or uprights 4. A second pair of laterally spaced posts or uprights 5 are disposed somewhat rearwardly of the medial section of the plate 3. Both pairs of uprights have aligned bores as at 6, parallel to the longitudinal axis of the gun mount and form bearings to support a pair of spaced rods 7 and 8. A substantially U-shaped crosspiece 9, Figure 7, is provided for mounting the front end of the machine gun 2. In the arrangement shown a forward portion of the breech of the gun is received between the arms of the crosspiece 9, as shown upon Figure 4 and a retainer pin 10 is passed through aligned bores 31 and 32 in the upstanding arms of the crosspiece and a forward mounting hole in the gun. Three set screws 11 are threaded upwardly through holes 12 in the base of the crosspiece and engage the lower surface of the gun. Two of these screws are laterally spaced and positioned a little forwardly of the crosspin while the other is centrally positioned a little to the rear of the pin. Tightening of these screws therefore pre-

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vents rotation of the crosspiece with respect to the gun. See Figures 1 and 4. The ends of the cross-piece 9 are bored as at 13 for slidably mounting the same upon rods 7 and 8. A predetermined plurality of Belleville springs 14, each having for example, a spring rate of 5,500 p. s. i., are stacked on the rods 7 and 8 on either side of the crosspiece and between the upright members 4 and 5. Spacer tubes 15, provided with enlarged heads 17 are mounted upon the rods 7 and 8 between uprights 4 and the forward end of the stacked springs 14. Adjusting nuts 16 are provided on rods 7 and 8 between the other end of the stacked springs and uprights 5. The springs 14 may be arranged in series, parallel or parallel-series, as seen in Figures 10, 11 and 12, respectively, depending upon the particular spring rate desired.

On the rearward end of the upper surface of the fixed member 3, there is provided a pair of laterally spaced elongated uprights 19, each of the uprights having a pair of transversely disposed threaded holes 20, for a purpose to be described. A pair of spaced track members 21 comprising flat hardened insert strips, lie in shallow mortises 22 formed in the upper surface of 3 between the members 19. The members 21 are fastened to 3 by screws 23. A pair of angle pieces 24 of about the same length as the inserts, are fastened to uprights 19 by cap screws passing through vertically elongated slots 26 in angle pieces 24 and threaded holes 20 in uprights 19, providing vertical adjustment of the angle pieces with respect to the upper surface of base member 3.

The rear portion of gun 2 is mounted by a shaft 27 passing through the rear pintle holes of the gun as indicated upon Figure 5. This shaft is provided with a pair of spaced rollers 28, normally bearing upon the track members 21 and a second pair of rollers 29 of somewhat smaller diameter are provided on the same shaft at the outer sides of the larger rollers 28 and are spaced therefrom and normally bear upon the under surface of angle pieces 24 to positively maintain rollers 28 upon the tracks 21 whereby the gun is limited to translation with respect to the base.

The platform 3 is suitably bored as at 30 for mounting the assembly on an elevating mechanism (not shown) whereby the angle of elevation of the gun may be varied as desired.

By various arrangements of the calibrated springs upon the rods 7 and 8 as depicted in Figures 10, 11 and 12, more or less resistance may be provided to oppose recoil of the gun, and various conditions due to the gun fire may be determined by the number and arrangement of springs employed.

Since the springs are calibrated, the recoil and the forces generated thereby may be determined depending upon the spring rate, number and arrangement of the springs. The initial force can be adjusted through nuts 16. Figures 10, 11 and 12 show various possible arrangements of the springs. By varying their number and arrangement the resistance to recoil may be varied over a wide range and the effects of various resistances upon the rate of fire can be determined. If desired, a scale upon base 3 in conjunction with a pointer fixed with the gun can be provided to determine the distance of recoil for the various spring arrangements. It is to be noted that the parts actually fixed to the gun are relatively small and have negligible inertia as compared with the mass of the gun itself. Hence they do not materially affect the results of tests.

We have thus provided a machine gun test stand which affords an extremely rigid support for the gun while permitting controlled recoil and affording test conditions closely simulating those encountered in use. While a preferred form of the invention has been shown and described, various modifications and substitutions of equivalents will occur to those skilled in the art after a study of the foregoing disclosure. Hence, the disclosures should be taken in an illustrative rather than a limiting sense, and it is the desire and intention to reserve all modifications within the scope of the subjoined claims.

In these claims the expression "axially" or "axially spaced" means a direction along or parallel with the barrel of a gun carried by the mount.

Having now fully disclosed the invention, what I claim and desire to secure by Letters Patent is:

1. In a mount for testing a machine gun, a base plate, a pair of rods, means rigidly fixing said rods to said plate in parallel laterally spaced relation thereover, a crosspiece adapted to be rigidly affixed to a gun to be tested, the ends of said crosspiece being slidably mounted upon said rods, respectively, for translation therealong, first and second sets of calibrated springs on said rods and abutting said crosspiece forwardly and rearwardly thereof, respectively, means adjustably fixed with said rods for varying the compression of said springs on said crosspiece, roller means adapted for connection with the gun in axially spaced relation with said crosspiece, and track means fixed with said base plate and confining and guiding said roller means for movement in a direction parallel with said rods.

2. In a mount for testing a machine gun, a base plate, a pair of rods, uprights fixed with said plate and rigidly mounting said rods in laterally-spaced parallel relation on said plate, a crosspiece generally U-shaped in cross section transversely of said base plate and having bores in its arms slidably receiving said rods, respectively, means carried by said crosspiece for connecting a gun thereto between said rods, first and second sets of springs slidably mounted on each rod and receiving a respective arm of said crosspiece therebetween, abutment means for said first sets of springs and fixed with respect to said base plate, a nut threaded on each rod for adjustment to vary the initial compression of the corresponding springs and the resistance to sliding of said crosspiece relatively to said base, roller means adapted for connection with a gun in axially spaced relation with said crosspiece, track means on said base plate for said roller means, and means fixed with said base plate confining said roller means to movement on and along said track means in parallelism with said rods.

3. In a mount for testing a machine gun, a base plate, a pair of rods, means fixedly mounting said rods on said base plate in laterally spaced parallel relation, a crosspiece U-shaped in cross section transversely of said rods, the arms of said crosspiece being slidably mounted on the respective rods, a plurality of Belleville springs on said rods and receiving the corresponding arm of said crosspiece therebetween, means adjustably fixed with said rods for initially compressing said springs to vary the initial compression on said crosspiece, roller means adapted for connection with the gun in axially spaced relation with said crosspiece, and track means fixed with said base plate and guiding and confining said roller means for movement in the direction of said rods.

4. In a test mount for a machine gun, a base plate, a pair of rods, uprights fixed to said base plate and mounting said rods in parallel side-by-side relation spaced transversely of said plate, a plurality of Belleville springs stacked on each rod, a U-shaped crosspiece having arms with apertures slidably fitting said rods, each arm being interposed between the springs of a respective rod, means adjustably carried by each said rod to selectively initially compress the springs thereon, and roller and track means

carried by said plate in axially spaced relation with said rods, said last-named means being adapted for connection with the gun in axially spaced relation with said crosspiece.

5. A test mount as recited in claim 4, a pin carried by said crosspiece in apertures in the arms thereof aligned transversely of said base, said pin being adapted to pass through a mounting hole in said gun, and first and second set screws threaded through the bight portion of said crosspiece to engage said gun at points forwardly and rearwardly, respectively, of said pin.

6. In a test mount for a machine gun, a fixed mount member, a plurality of suitably spaced upright members having longitudinal bores provided therein, said upright members being integral with said fixed mount member, a pair of rod members having their ends mounted within said upright members, a substantially U-shaped cross piece suitably attached to the front mounting hole of a machine gun and adapted for slidably mounting said cross piece upon said rod members, a plurality of Belleville springs mounted on said rods and being disposed on either side of said cross piece, means for adjusting and spacing said Belleville springs carried by said rods, means for movably mounting the rear portion of the gun to said fixed mount member comprising a shaft mounted in the rear pintle of the gun, a first pair of rollers, and a second pair of rollers of smaller diameter than said first pair of rollers, all mounted in spaced relation upon said shaft, bearing means for said rollers carried by the upper surface of said fixed member comprising a pair of spaced track members fixed to the upper surface of said fixed member, and a second pair of track members comprising a pair of vertically adjustable angle pieces mounted to a pair of suitably spaced upright members carried by the upper surface of said fixed mount member.

7. A test mount for a machine gun comprising, a base plate, a pair of rods, means fixedly mounting said rods on said base plate in side by side parallel relation spaced transversely of said plate, a plurality of Belleville springs stacked on each rod, a crosspiece member mounted at its respective ends on said rods for limited translation therealong, said member being positioned between the springs on each rod and adapted to be releasably fixed to the gun to support the same, a fixed abutment at one end of each rod for the springs thereon, a nut threaded on each rod at the other ends of said springs and adjustable to vary the initial compression of said springs on said abutment and crosspiece member, a roller carriage adapted to be fixed to the gun in axially spaced relation with said crosspiece and guide means on said base plate holding said roller carriage thereto for rolling only in a direction parallel with said rods.

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