

[54] **SAFING MEANS FOR HIGH RATE OF FIRE REVOLVING BATTERY GUN**

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[58] Field of Search **89/9-12**

[56]

References Cited

UNITED STATES PATENTS

427,239	5/1890	Murphy	89/12
3,611,871	3/1970	Kirpatrick	89/12

Primary Examiner—Samuel W. Engle

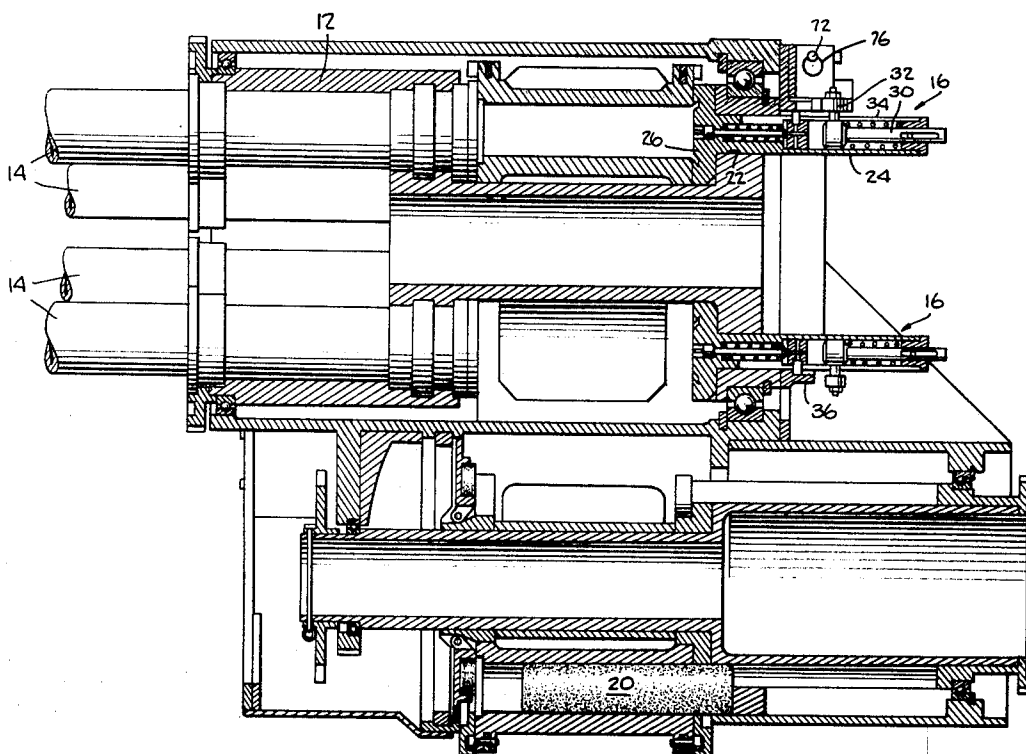
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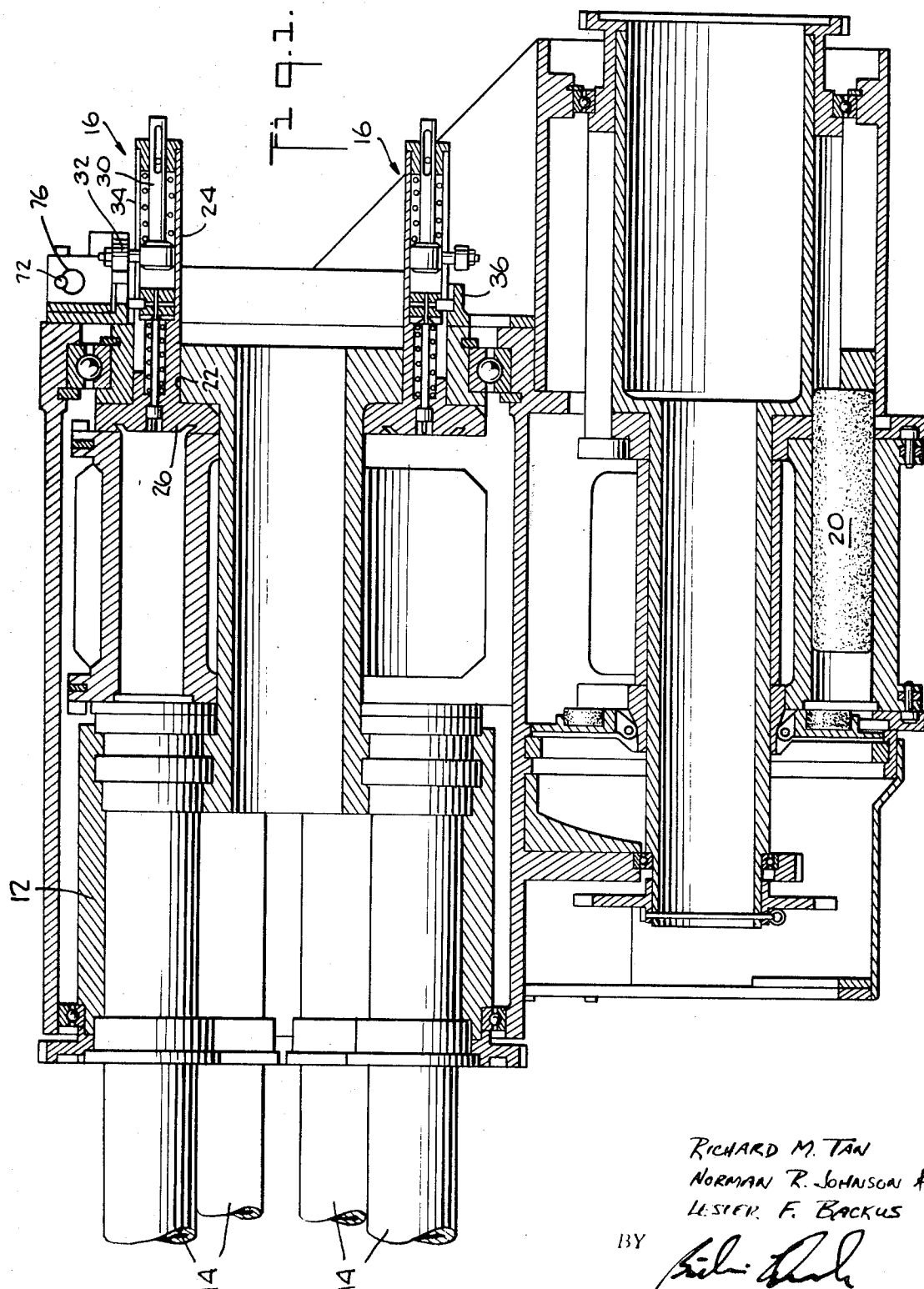
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ABSTRACT

A revolving battery gun has a plurality of bolts with respective firing pins and mainsprings, and switchable firing pin control means having a first disposition for positively precluding searing of each firing pin and a second disposition for positively forcing timely searing of each firing pin.

4 Claims, 5 Drawing Figures



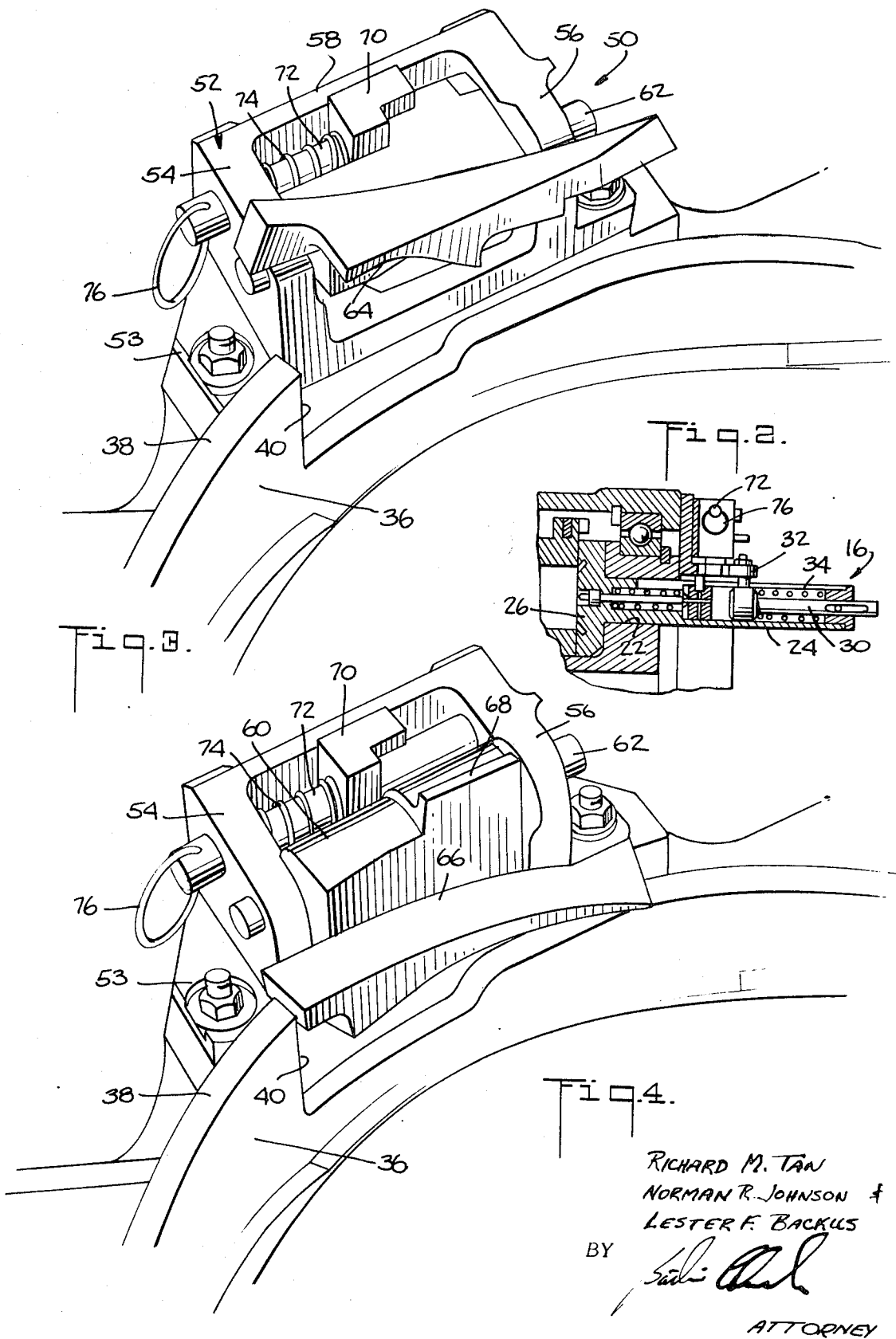


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SAFING MEANS FOR HIGH RATE OF FIRE REVOLVING BATTERY GUN

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to means for positively precluding and for positively forcing timely searing of the respective firing pins in a revolving battery gun. The invention herein described was made in the course of or under a contract or sub contract thereunder with the Department of the Air Force.

2. Prior Art

In U.S. Pat. No. 125,563, issued Apr. 9, 1872 to R. J. Gatling, there is shown the classic modern revolving battery gun. A stationary housing encloses and supports a rotor assembly which has a plurality of barrels and a like plurality of bolts. Each bolt has its own firing pin and mainspring. Each bolt is traversed longitudinally by a stationary elliptical cam track in the housing. As the bolt is traversed forward, the firing pin is captured to the rear by a stationary cam track in the housing, compressing the mainspring until the bolt and the barrel reach the firing position, at which position the cam releases the firing pin. No safing function is provided.

In U.S. Pat. No. 3,380,341, issued Apr. 30, 1968 to R. E. Chiabrandy, there is shown a revolving battery gun having a single mainspring serving all of the bolts. A safing function is provided by a sector of the housing cam track which can be swung away from the bolts and which has a projection to block the spring.

In U.S. Pat. Application Ser. No. 24,199, filed Mar. 31, 1970, now U.S. Pat. No. 3,611,871, by R. G. Kirkpatrick et al there is shown a revolving battery gun having a plurality of bolts and respective mainsprings. The bolt is traversed longitudinally by a housing elliptical cam, and is rotated into lock and seat by a cam in the aft end of the housing. A safing function is provided by shifting the aft end cam to preclude rotation of the bolt.

SUMMARY OF THE INVENTION

It is an object of this invention to provide an improved Gatling type gun having a mechanism which selectively, and alternatively functions to positively preclude searing of each bolt and to positively force timely searing of each bolt.

A feature of this invention is the provision of a revolving battery gun having a plurality of bolts with respective firing pins and mainsprings, and switchable firing pin control means having a first disposition for positively precluding searing of each firing pin and a second disposition for positively forcing timely searing of each firing pin.

BRIEF DESCRIPTION OF THE INVENTION

These and other objects, features and advantages of the invention will be apparent from the following specification thereof taken in conjunction with the accompanying drawing in which:

FIG. 1 is a view in longitudinal cross-section showing an embodiment of the switchable firing pin control means of this invention incorporated in a gun of the type shown in U.S. Patent application, Ser. No. 148,651 filed June 1, 1971, by J. M. Seemann, with the control means in the firing disposition;

FIG. 2 is a detail of the gun of FIG. 1 showing the control means in the safe disposition;

FIG. 3 is a perspective detail view of the control means in the firing disposition; and

FIG. 4 is a perspective detail view of the control means in the safe disposition.

DESCRIPTION OF THE PREFERRED INVENTION

The revolving battery gun shown in FIG. 1 is of the type shown in Ser. No. 148,651, supra, and antecedent applications mentioned therein, to which reference may be had for a more complete description of the overall gun. Briefly, the gun includes a stationary housing 10 in which are journaled a rotor assembly including a receiver 12 having a plurality of gun barrels 14 and a like plurality of firing pin assemblies 16. A plurality of chambers 18 are linked into an endless train and carry respective rounds of caseless ammunition 20 into the firing position between a respective gun barrel and a firing pin assembly.

Each firing pin assembly 16 is disposed in a respective bore 22 which is coaxial with a respective gun barrel, and includes a body having a stem portion 24 press-fitted into the bore, and a head portion 26. The head portion has a central bore with a firing pin 28 which is spring loaded aft. The stem portion has a coaxial bore with a hammer 30 which is spring loaded forward. A cam follower 32 is fixed to and projects transversely from the hammer through a longitudinal slot 34 in the stem portion and rides on an annular firing cam 36 fixed to the aft end of the housing.

The annular cam 36 has a transverse annular surface 38 with a gradual rise to a sharp drop at 40. When the cam follower 32 rides off the drop 40, the hammer spring drives the hammer forward to impact with and drive the firing pin forward to fire the round of ammunition.

A firing pin control assembly 50 is fixed to the housing adjacent the cam 36. The assembly includes a bracket 52 fixed to a transverse flange 53 on the cam. The bracket includes two side walls 54 and 56, and a forward wall 58. A cam block 60 is journaled on a rod 62 which is fixed through and between the two side walls 54 and 56. The block has a concave sinusoidal cam surface 64 and a convex cam surface 66 generated about respective axes which lie in mutually perpendicular planes; and a lug 68. An L-shaped block 70 is fixed to a rod 72 which is journaled through and between the two side walls. A helical compression spring 74 is captured on the rod between the block and the side wall. A finger pull ring 76 is fixed to the rod beyond the side wall 54 whereby the block 70 may be pulled against the bias of the spring towards the wall 54. The forward wall 58 prevents the block 70 from rotating.

When the cam block 60 is in the firing position, shown in FIG. 3, the lug 68 is captured between the rod 72 and the block 70, and the concave, sinusoidal cam surface 64 is adjacent to, subsequent to and overlying the cam drop 40. As the cam follower rides off the high, or longitudinally aft portion of the cam surface 38 at the drop 40 it flies onto the cam surface 64 and is thereby positively guided longitudinally forward to drive the hammer forward, irrespective of whether the hammer spring is functioning or not. The follower than flies onto the low or forward end of the cam surface 38 to commence a new cycle of cocking the hammer.

When the finger ring is pulled, the block 70 releases the lug 68, and the block 60 may be rotated 90° so that the convex cam surface 66 is adjacent to, subsequent

to the cam lug 40, and forming a continuum with and between the high or longitudinally aft portion of the cam surface and the low or longitudinally forward portion, as is shown in FIG. 4. As the cam follower rides off the high portion of the cam surface 38, it rides onto and along the convex surfac 66 and thence onto the low portion of the cam surface 38, gently lowering the hammer without firing, to commence a new cycle of cocking the hammer.

It will thus be appreciated that a simple pull on the ring 76 and a flipping of the cam block 60 is all that is required to shift to and from the positive-safe and positive-fire dispositions of the firing pin control assembly.

It will also be appreciated that while a pivoting cam block has been illustrated, other switching may be provided, such as a sliding cam block carrying the two cam surfaces in side by side relationship.

While a preferred embodiment has been shown, it will be appreciated that the invention may be embodied otherwise than as herein specifically illustrated or described, and that certain changes in the form and arrangement of parts and in the specific manner of practicing the invention may be made without departing from the underlying idea or principles of this invention within the scope of the appended claims.

What is claimed is:

1. A battery gun comprising:

a housing;

a rotor journaled for rotation within and with respect to said housing;

said rotor having a plurality of gun bolts disposed in an annular row with respective firing pins, assemblies; and

switchable firing pin assembly control means mounted to said housing for sequentially engaging each of said firing pin assemblies, and having a first disposition for positively precluding searing of each firing pin assembly, and a second disposition for positively forcing timely searing of each firing pin;

said firing pin assembly control means including an annular cam surface having a lower portion which gradually rises to a higher portion which

abruptly falls off to said lower portion, and first and second movable cam surfaces and support means for alternatively supporting one or the other of said movable cam surfaces in cooperative relationship with said annular cam surface, said first cam surface, when in said cooperative relationship, serving as a gradual continuum between said higher portion and said lower portion in lieu of said fall-off, and

said second cam surface, when in said cooperative relationship, serving as an accelerating surface adjacent and between said higher portion and said lower portion for accelerating a fall-off.

2. A gun according to claim 8 wherein:

each bolt assembly includes a respective cam follower which rides on said annular cam surface.

3. A gun according to claim 1 wherein:

each bolt assembly includes a respective cam follower which is spring biased against, and rides on, said annular cam surface.

4. A gun according to claim 1 wherein:

said second cam surface is concave towards said annular cam surface.

5. A gun according to claim 1 wherein:

said first and second cam surfaces are formed on a common element which may be latched in either said first or second disposition.

6. A gun according to claim 1 wherein:

said rotor is journaled for rotation about a first longitudinal axis;

each of said bolts has a respective firing pin actuator means journaled for reciprocation along respective axes parallel to said first longitudinal axis, with a respective mainspring for biasing said actuator forward and a respective cam follower for riding on said annular cam surfaces and limiting forward movement of said respective firing pin actuator means;

said second cam surface serving to receive each said cam follower as it falls off said higher portion and to deflect and to accelerate its drop towards said lower portion.

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