United States Patent

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[45] Patented **June 8, 1971**
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[54] **DELAY ARMING MECHANISM**
12 Claims, 12 Drawing Figs.

[52] **U.S. Cl.** **102/80,** 102/79
[51] **Int. Cl.** **F42c 15/26,** F42c 15/34, F42c 15/04
[50] **Field of Search** 102/79, 80

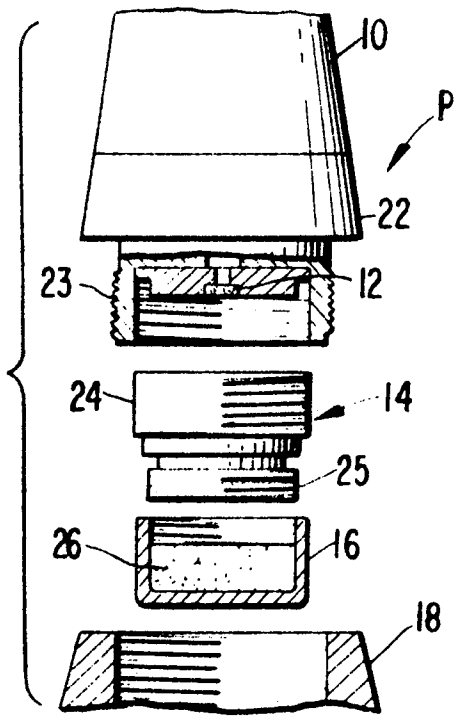
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Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—Thomas H. Webb
Attorney—LeBlanc & Shur

ABSTRACT: The mechanism includes a housing having a blast opening through one end wall coincident with the spin axis of the projectile and a fuse mechanism including an explosive charge adjacent the opposite end wall. Three rotor assemblies mounted on pivots offset from the projectile spin axis, overlie the blast hole with their rotors disposed to initially prevent propagation of the explosive output from the charge to the blast hole. Two such assemblies have their centers of gravity coincident with the projectile spin axis while one rotor assembly has its center of gravity slightly offset from the spin axis. The first rotor assembly is locked by a pair of detents and the second and third assemblies are locked by cams carried on the first and second assemblies respectively. When the projectile spins, the detents unlock the first rotor assembly, and centrifugal force causes it to rotate to a position unlocking the second rotor assembly. The first rotor assembly drives the second rotor assembly such that its center of gravity is offset from the projectile spin axis. The second rotor assembly then rotates under centrifugal force to positions to respectively unlock the third rotor assembly and drive the latter such that its center of gravity is offset from the spin axis. The three rotors rotate under centrifugal force to locate cutout portions in line with the blast hole and the third rotor places a detonator in direct alignment with the blast hole. These rotor movements permit explosive propagation through the delay arming mechanism.



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SHEET 1 OF 2

FIG. 2

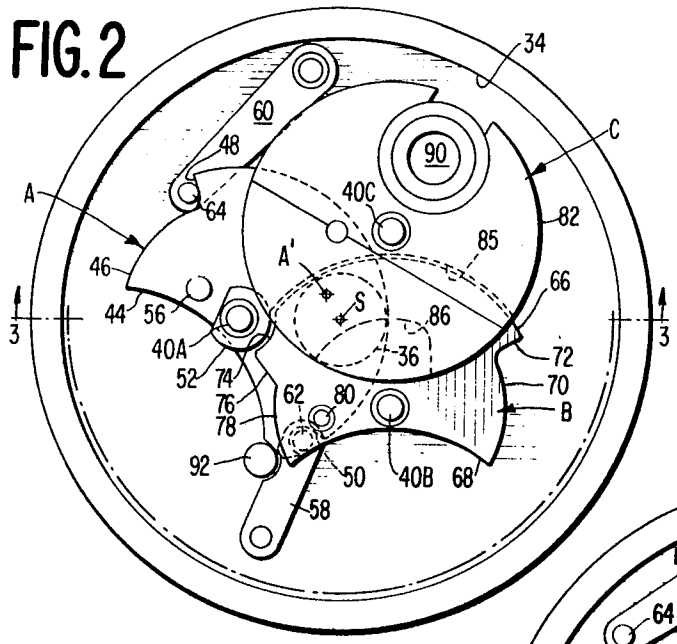
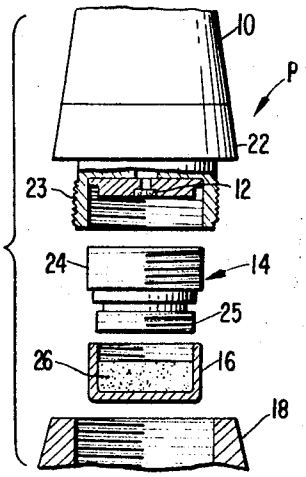


FIG. 1



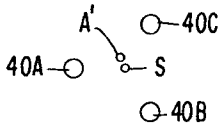


FIG. 2A

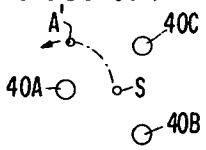


FIG. 4A

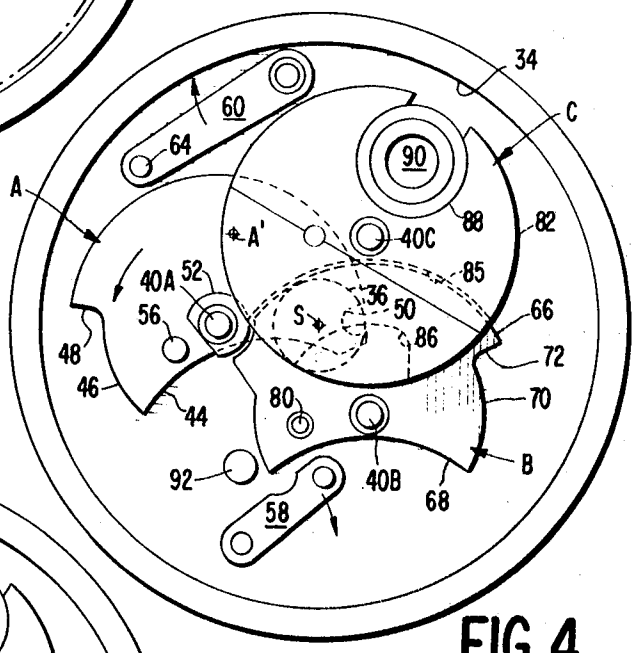


FIG. 4

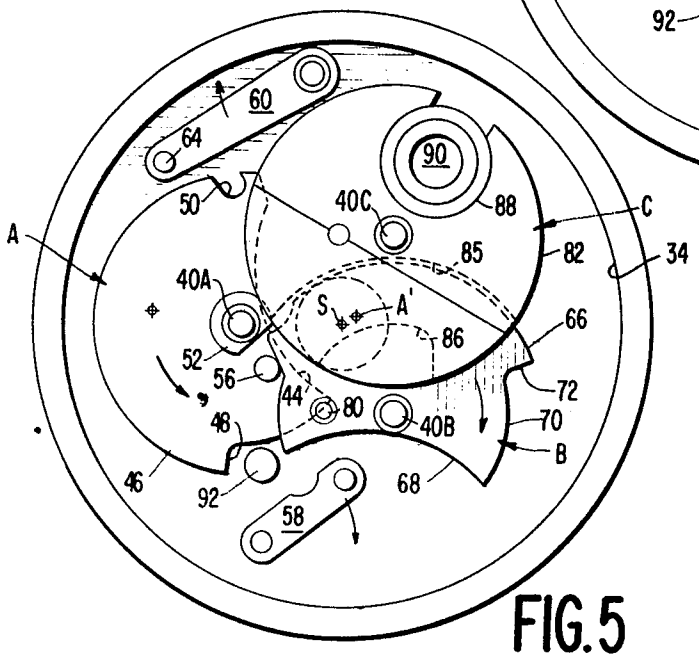


FIG. 5

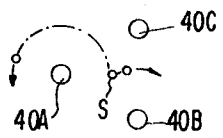
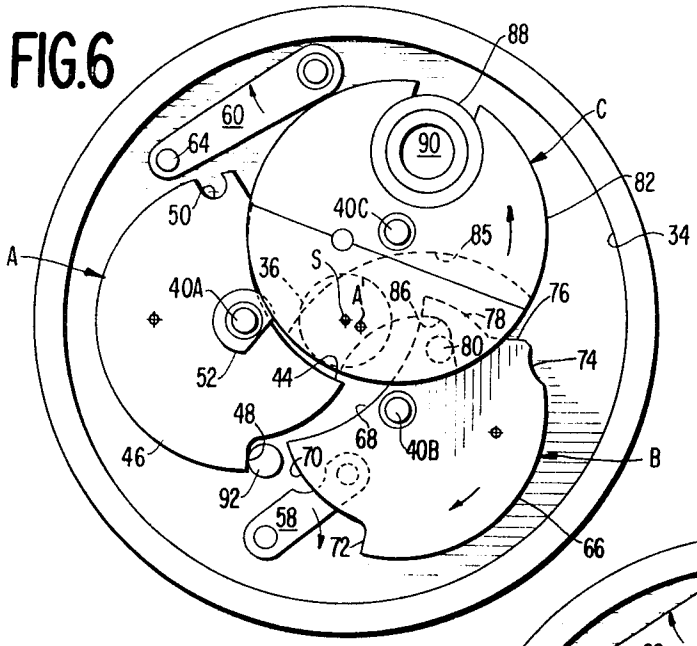


FIG. 5A

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FIG.6



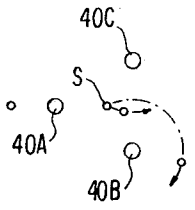


FIG.6A

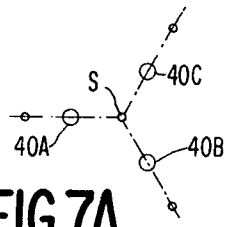


FIG.7A

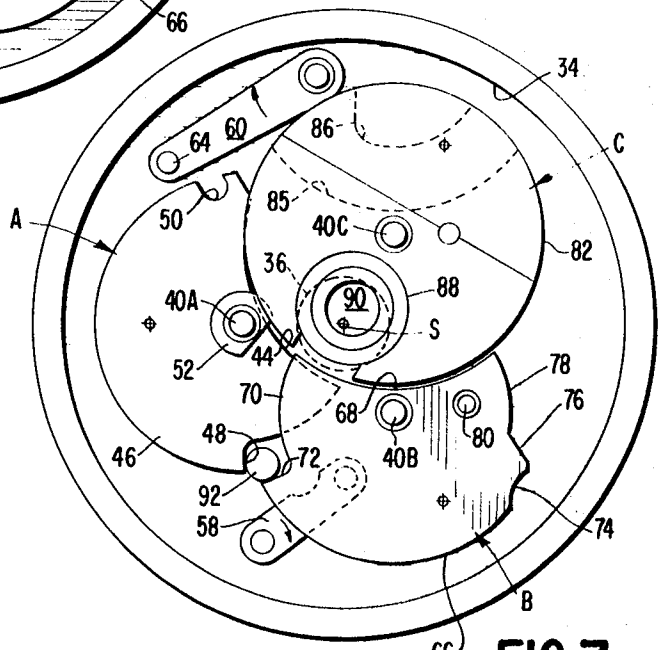
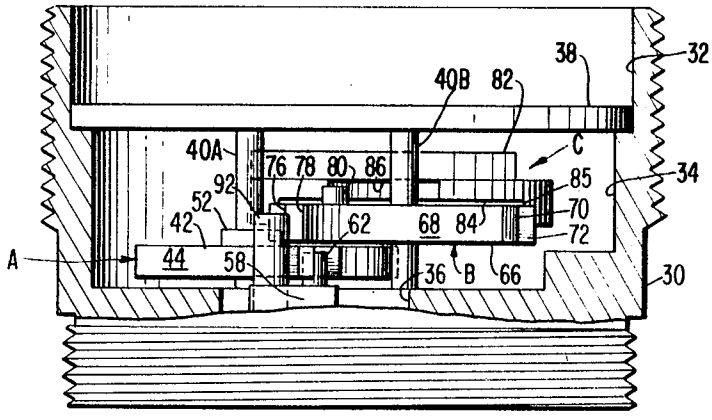


FIG.7

FIG. 3



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DELAY ARMING MECHANISM

This invention relates to a delay arming mechanism forming a part of a booster charge for a fused, rifle-launched, projectile and particularly relates to a delay arming mechanism disposed between the fuse and the booster charge to prevent detonation of the latter upon premature actuation of the fuse.

Delay arming mechanism have been provided in the past. Such mechanisms have often taken the form of one or more levers initially disposed between a fuse and a charge to prevent detonation of the charge upon premature actuation of the fuse. The levers are usually movable in sequence under centrifugal force into positions permitting detonation of the charge upon actuation of the fuse. One prior form of such mechanisms provides such levers in conjunction with a timing movement. Centrifugal action provides the motive force for the movement, permitting release of the levers to a projectile armed position after a predetermined time delay. In another such mechanism, a detonator shutter rotates under centrifugal force upon firing of the projectile to locate an aperture in line with a detonator. Simultaneously a striker shutter is released for rotation to permit alignment of the striker with the aperture. Many other mechanisms utilize gears and pinions to arm the projectile. However, to my knowledge, none of these mechanisms provide delay times inversely proportional to the muzzle velocity of the projectile or a gearless operation.

The present improved delay arming mechanism provides delay times inversely proportional to the muzzle velocity of the projectile portions a unique arrangement of a plurality of rotor assemblies. The rotor assemblies prevent propagation of the explosive output from the fuse to the projectile booster charge until a minimum separation distance between the projectile and the firing device has been obtained. Particularly and in the preferred form hereof, the present delay arming mechanism comprises a housing having a blast hole adjacent its lower end in communication with the projectile booster charge. Three rotor assemblies are rotatably mounted in the housing on pivots offset from the spin axis of the projectile. The rotor assemblies are initially aligned and locked such that portions of the rotors overlie and block the blast hole. Thus, the explosive output from a prematurely actuated fuse on the opposite side of the housing is prevented from propagating through the arming delay mechanism and through the blast hole to the booster charge. Through a unique arrangement of the rotor assemblies and the centers of gravity thereof, the delay times provided by the present invention are inversely proportional to the muzzle velocity. The rotors are sequentially unlocked and rotated to bring cutout portions of the first two rotors in an overlying position over the blast hole with the third rotor which carries an initially misaligned flash detonator, being subsequently rotated so that the flash detonator lies in line with the cutout portions of the first two rotor assemblies and in line with the blast hole.

To accomplish this sequential time delaying action, the center of gravity of the first rotor assembly directly overlying the blast hole is slightly offset from the spin axis of the projectile. The first rotor assembly accordingly tends to rotate under the centrifugal force imparted thereto by the spin of the projectile after firing. The centers of gravity of the second and third rotor assemblies are initially aligned with the spin axis of the projectile as to remain uninfluenced by projectile spin. Positive locking devices are provided the rotor assemblies with the first rotor assembly being initially locked from rotation by a pair of pivoted detents. The second and third rotor assemblies are locked from rotation by cams carried by the first and second rotor assemblies. The second and third rotor assemblies are sequentially unlocked and rotated upon respective rotation of the first and second rotor assemblies to predetermined positions.

In operation, the rotor assemblies are initially aligned so that premature detonation of the fuse cannot propagate an explosive output to the blast hole. When the projectile is fired and obtains a predetermined spin velocity, the locking detents move outboard and release the first rotor assembly for rotation under centrifugal force, its center of gravity being initially offset from the projectile spin axis. During this rotation, the second and third rotor assemblies are maintained locked from rotation by the respective locking mechanisms disposed between the first and second and second and third rotor assemblies. When the first rotor assembly reaches a predetermined angular position, it unlocks the second rotor assembly. Upon further rotation, the first rotor assembly engages and drives the second rotor assembly so that the center of gravity of the latter is displaced from the projectile spin axis. Centrifugal force thus drives the second rotor assembly to a predetermined angular position whereupon it unlocks the third rotor assembly. Upon further rotation, the second rotor assembly engages and drives the third rotor assembly to offset the latters' center of gravity from the spin axis of the projectile. The third rotor assembly thus rotates under the influence of centrifugal force. The centers of gravity of the rotor assemblies are located such that centrifugal force drives them into final positions locating and maintaining the cutout portions of the first and second assemblies and the flash detonator of the third assembly in line with the blast hole whereby the projectile is armed.

By the unique location of the pivot axes of the rotor assemblies and their centers of gravity with respect to the spin axis, the torque applied to the rotor assemblies to overcome their moments of inertia varies. Thus, a predetermined time delay is obtained before the rotor assemblies reach the in-line, and hence projectile armed, position. The time delay is accordingly proportional to the spin and hence muzzle velocity of the projectile with the total time delay between firing and arming of the projectile being the sum of the individual time delays of the sequentially actuated rotor assemblies and the time delay afforded by the centrifugally actuated locking detents.

Accordingly, it is a primary object of the present invention to provide an improved arming delay mechanism for rifle-launched fused projectiles.

It is another object of the present invention to provide a delay arming mechanism for a fused projectile wherein the delay time is inversely proportional to the muzzle velocity of the projectile.

It is still another object of the present invention to provide a delay arming mechanism having a plurality of rotor assemblies responsive to projectile spin to align a flash detonator with the blast hole communicating with a booster charge thereby providing an explosive train therebetween.

It is a further object of the present invention to provide a delay arming mechanism having a plurality of rotor assemblies rotatable in sequence to align a flash detonator with a blast hole and booster charge. It is a related object of the present invention to provide unique mechanisms for locking the rotor assemblies from rotation and sequentially unlocking the same to achieve a projectile armed status.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, appended claims, and drawings, wherein:

FIG. 1 is an exploded side elevational view of a portion of a projectile illustrating the relationship of the delay arming mechanism of the present invention with the fuse and booster charge carried by the projectile and with portions broken out and in cross section;

FIG. 2 is an enlarged plan view of the arming delay mechanism hereof illustrated in a projectile safe position;

FIG. 2A is a schematic illustration of the relative relation of the pivotal axes and centers of gravity of the rotor assemblies and their relation to the spin axis of the projectile when in the safe position illustrated in FIG. 2;

FIG. 3 is a cross-sectional view of the delay arming mechanism taken generally about on line 3–3 in FIG. 2;

FIGS. 4, 5, 6 and 7 are plan views similar to FIG. 2 illustrating the various positions of the rotor assemblies during the

arming sequence with FIG. 7 illustrating the delay arming mechanism in an armed position; and

FIGS. 4A, 5A, 6A, and 7A are schematic views illustrating the relation of the pivotal axes and centers of gravity of the rotor assemblies and their relation to the spin axis of the projectile during the arming sequence illustrated in FIGS. 4—7 respectively.

Referring to the drawing, particularly to FIG. 1, there is schematically illustrated the nose portion of a projectile, generally indicated at P, having a fuse 10, an explosive output charge 12 adapted to be detonated by fuse 10, the delay arming mechanism of the present invention, generally indicated at 14, a booster charge 16, and a projectile body portion 18. Fuse 10 may comprise any well-known type, for example, a time settable fuse, a point detonating fuse or a combination time fuse with point detonating features, and preferably is of the type wherein rotation of nose 20 relative to a fixed part 22 of fuse 10 sets a predetermined time interval, at the end of which, the explosive charge 12 is detonated. Portion 22 has an axially projecting annular part 23 which is internally and externally threaded with the internally threaded portion 24 of delay arming mechanism 14. Mechanism 14 includes a generally cup-shaped member which is externally threaded as at 25 adjacent it s lower end. The generally cup-shaped booster 16 is internally threaded adjacent its upper end and threads on the lower end of member 14, booster 16 containing a booster charge 26. In final assembly, the externally threaded portion 23 of body 22 is received within the internally threaded bore of the projectile body 18.

In use, projectile P may be detonated, after a predetermined time delay, or by impact with a target, in the usual fashion by detonation of charge 12 by fuse 10, the explosive output of which passes through the delay arming mechanism 14 hereof when armed to ignite booster charge 26 which in turn detonates the projectile. With this general arrangement, it will be seen that, without a delay arming mechanism, premature detonation of explosive charge 12 by fuse 10 or otherwise would result in detonation of projectile P. The interposition of the delay arming mechanism 14 in the firing train, precludes propagation of the explosive output from charge 12 to the booster charge 26 in the event of premature detonation of charge 12 and permits detonation of the projectile only after a predetermined spin velocity and time delay proportional to the muzzle velocity of the launch weapon has been obtained. This insures a minimum separation distance between the projectile and weapon before detonation can occur.

Referring now to FIGS. 2 and 3, the delay arming mechanism 14 hereof comprises a generally cup-shaped housing 30 having stepped bores 32 and 34 with a coaxial blast opening 36 of reduced diameter formed through the lower end wall. Blast opening 36 provides communication through the housing to booster charge 26 when the mechanism 14 and booster 16 are finally assembled as shown in FIG. 1. A plate 38 is received in bore 32 and is retained against the shoulder formed by bores 32 and 34 by suitable means, not shown. A plurality of shafts 40A, 40B and 40C, on which the rotor assemblies generally indicated A, B, and C are mounted, extend between plate 38 and the end wall of housing 30. Shafts 40A, 40B, and 40C are laterally offset from the spin axis of the projectile indicated at S and provide axes of rotation for the rotor assemblies parallel to the spin axis S.

Rotor assembly A comprises a generally circular rotor 42 fixedly carried by shaft 40A. Rotor 42 includes an arcuate cutout portion 44, a cutout portion 46 forming a shoulder 48 with the periphery thereof, and a peripheral recess 50 (FIG. 6). On the upper face of rotor 42 and above shaft 40A, there is carried for rotation therewith a reduced diameter collar 52 having a chordwise cutout portion 54, collar 52 projecting above rotor 46 for a short distance. An upwardly projecting pin 56 is also carried by rotor 46 for reasons amplified hereinafter. To initially lock rotor assembly A against rotation, a pair of levers 58 and 60 are pivotally mounted at one end on body 30 and carry respective locking pins 62 and 64 adjacent their free ends. Locking levers 58 and 60 are biased inwardly by springs, not shown. Thus, in the illustrated initial position of rotor assembly A in FIG. 2, locking pin 62 is biased into engagement within peripheral recess 50 and locking pin 64 is biased into engagement against peripheral cutout portion 46 and shoulder 48 thereby initially locking rotor assembly 46 from rotation. Note that rotor 42, when lying in its initial rotary position, overlies blast hole 36 and thereby precludes entry of an explosive output from charge 12 through hole 36.

Rotor assembly B includes a generally circular rotor 66 carried by shaft 40B at an elevation spaced slightly above rotor 46, such that portions of rotor B as disposed in overlying relation to portions of rotor 46, a portion of rotor B also overlying blast hole 36 when rotor assembly B lies in its initial position as seen in FIG. 2. For reasons which will become clear, rotor 66 has an arcuate cutout portion 68, a cutout portion 70 forming a shoulder 72 with the periphery thereof, a circular cutout portion 74 and a pair of cutout surfaces 76 and 78. A pin 80 is also carried on one side of rotor 66 and projects upwardly therefrom.

Rotor assembly C comprises a rotor 82 fixedly carried by shaft 40C and spaced above rotors 42 and 46 with a lower portion lying in a common plane with rotor 66 for reasons which become clear. The underside or lower portion of rotor 82 is provided with a cutout 84 defining a circular wall 85. When rotor 82 lies in the initial position illustrated in FIG. 2, a circular portion of rotor 66 lies within cutout 84 with its circular peripheral wall portion lying in close spaced relation to wall 85. It will thus be apparent that, when rotor assemblies B and C lie in the initial position, rotor assembly C is locked from rotation by rotor assembly B. A second cutout 86 is formed through the face of cutout 84 as to receive the pin 80 carried by rotor 66 when the latter rotates to drive rotor 82 as described hereinafter. A cylinder 88 is secured in a corresponding cutout of rotor 82 and carries flash detonation material 90. The lower end of cylinder 88 extends to adjacent the lower end wall of housing 30. When the rotor 82 lies in its initially locked position as seen in FIG. 2, it is laterally offset from the blast hole 36 and clears the rotors 42 and 66.

It is a unique feature of the present invention that the respective centers of gravity of the rotor assemblies A, B and C are disposed in a manner such that the spin motion of the projectile has no rotational effect on rotor assemblies B and C and imparts a rotational force to rotor assembly A to initiate the time delay (accomplished by the rotor assemblies) after minimum threshold spin velocity is achieved. The center of gravity of rotor assembly A is indicated at A' and initially lies slightly offset from the spin axis S of the projectile (FIG. 2) and offset from a straight line joining the pivotal axis of rotor assembly A and the spin axis S. The rotor assemblies B and C are formed and arranged such that their centers of gravity, indicated at B' and C' respectively, are coincident with the spin axis S when lying in their initial rotary positions as indicated in FIGS. 2 and 2A. The centers of gravity can be located as described by varying the thickness of the rotors, forming special cutout portions, weighting various portions, or otherwise as is well known. Rotor Assembly A thus has a tendency to rotate in response to projectile rotation, whereas rotor assemblies B and C do not.

As can be seen from FIG. 2, the rotor assemblies A, B, and C are initially locked or disabled from rotation. The pins 62 and 64 on detent levers 58 and 60, under the bias of the springs, not shown, respectively engage within the recess 50 and against shoulder 48 on rotor 42, preventing rotation of the latter. Rotor assembly B is locked or disabled from rotation in its initial rotary position shown in FIG. 2 by the engagement of the circular periphery of cam 52 in circular cutout portion 74 of rotor 66. In this manner, rotor 66 is maintained in a position overlying the blast hole 36 and cannot be rotated until rotor assembly A has rotated to a predetermined position. Likewise, rotor assembly C is locked in its initial rotary position shown in FIG. 2. The circular cutout portion 84 on rotor 82 receives the corresponding circular periphery of rotor 66. Rotor as-

sembly C is thus locked or disabled from rotation until rotor assembly B rotates sufficiently as to withdraw its circular periphery from within cutout 84. That is to say, rotor assemblies B and C are locked or disabled from rotation in their initial positions by respective rotor assemblies A and B. It is only through the sequential rotation of rotor assemblies A and B to predetermined angular positions which will sequentially unlock respective rotor assemblies Band C. In the initial position of the rotor assemblies, each has a rotor portion overlying blast hole 36 (that is, in line between blast hole 36 and charge 12) and these rotor portions preclude transmission of the explosive output from charge 12 to booster 26 in the event of premature actuation of fuse 10.

When the projectile is fired from a rifled barrel, the rifling imparts a spin to the projectile proportional to its linear acceleration. When a minimum predetermined threshold angular velocity is obtained, the locking detents 58 and 60 pivot outwardly and thereby enable or release rotor assembly A for rotation, Since the center of gravity of rotor assembly A is initially offset from the spin axis of the projectile, it begins to rotate under the influence of the centrifugal force. Note that rotor assemblies B and C are maintained in their disabled positions while rotor assembly A is released and rotates from its initial position to a predetermined position. In FIG. 4, rotor assembly A is illustrated after rotation through an angle of approximately 70° at which time, the torque applied at the center of gravity of rotor assembly A by centrifugal force has increased to a maximum. Rotor assembly A continues to rotate and, as seen in FIG. 5, the chordwise cutout 54 on cam 52 is brought into alignment opposite the cutout 74 on rotor 66, thereby enabling or releasing the latter for rotation. Continued rotation of rotor 42 carries pin 56 into engagement against the cutout portion 76 on rotor assembly B. Further rotation of rotor assembly A to a position wherein its center of gravity lies on a straight line extending through the spin axis of the projectile and the pivot axis of rotor assembly A causes pin 56 to impart an initial rotation to rotor assembly B, thereby offsetting its center of gravity from the spin axis of the projectile as seen in FIG. 5. Rotor assembly A continues to rotate until shoulder 48 on rotor 42 butts a stop pin 92.

The initial angular displacement of rotor assembly B imparted to it by rotor assembly A, enables the centrifugal force of the rotation projectile to act on and rotate rotor assembly B. As seen in FIGS. 5 and 6, centrifugal force causes rotor assembly B to rotate through a predetermined angular displacement while rotor 66 simultaneously maintains rotor assembly C locked or disabled from rotation through the cooperation of the arcuate surface 84 and periphery of rotor 66. Note, in FIG. 6, that when the arcuate periphery of rotor 66 rotates beyond the cutout portion 84 of rotor assembly C, the latter is released for rotation. After about 150° of rotation as seen in FIG. 6, drive pin 80 on rotor 66 engages rotor 82 within its cutout portion 86. Continued rotation of rotor assembly B under centrifugal force, drives rotor assembly C such that its center of gravity is angularly displaced from the spin axis of the projectile as indicated in FIG. 6A at C'. Continued rotation of rotor assembly B permits withdrawal of drive pin 80 from within the peripheral confines of cutout portion 86 on rotor 66 and the latter continues to rotate under the centrifugal force until shoulder 72 butts stop pin 92. Angular displacement of the center of gravity of rotor assembly C from the spin axis of the projectile permits centrifugal force to act on rotor assembly C thereby causing rotor assembly C to rotate in a counterclockwise direction as seen in FIG. 6 to a position (FIG. 7) locating its center of gravity on a line extending through the spin axis S and the pivotal axis 40C. This final position also locates cylinder 88 in registry above blast hole 36. When the rotor assemblies A and B are rotated to their final positions illustrated in Fig. 7, their respective cutout portions 44 and 68 have been angularly displaced as to vacate the central portion of the housing 30 overlying blast hole 36 thereby permitting the flash detonator 90 carried by cylinder 88 to rotate into the central portions of the housing 30 and directly overlie blast hole 36. Thus, the explosive output of the charge 12, when detonated by fuse 10, can propagate through the flash detonator 90 and through the blast hole 36 for ignition of the booster charge 26 and hence the powder charge carried by the projectile.

The time delay in the arming mechanism is achieved by the varying torque applied to each of the rotor assemblies in overcoming their moments of inertia in combination with the sequential actuation of each of the rotor assemblies. It will be seen from FIGS. 2A, 5A, and 6A, that a varying torque is applied to each of the rotor assemblies as the associated center of gravity moves in a fixed arc around its pivot point. This controlled path for the center of gravity causes the torque applied at the center of gravity by centrifugal force to increase to a maximum during the first portion of the angular displacement of the rotor assembly. The torque thereafter decreases to zero as the center of gravity of the assembly moves outwardly into alignment with the projectile spin center and its pivot point as illustrated in FIG. 7A. The rotational rate for each rotor assembly is accordingly directly proportional to the centrifugal force it senses which in turn is directly proportional to the angular velocity of the projectile. In addition, the force transmitted to the center of gravity of each rotor assembly increases (varies directly as the square of the distance) as the distance of its center of gravity from the spin center increases to a maximum.

What I claim and desire to be secured by U.S. Letters Patent is:

1. Apparatus for delaying transmission of a fuse output to a charge in a rifle-launched projectile comprising a housing; first and second rotor assemblies carried by said housing for rotation about axes substantially parallel to and laterally offset from the spin axis of the projectile; at least portions of said rotor assemblies in their initial positions being located to interrupt transmission of the fuse output to the charge; said first rotor assembly having its center of gravity offset from the pivotal axis thereof and initially offset from the spin axis of the projectile; said second rotor assembly having its center of gravity offset from its pivotal axis and initially substantially coincident with the spin axis of the projectile; said first rotor assembly being rotatable from said initial position into a second position in response to rotation of the projectile; means responsive to the rotation of said first rotor assembly for offsetting the center of gravity of said second rotor assembly from the spin axis of the projectile, said second rotor assembly being thereby rotatable in response to rotation of the projectile into a second position, said rotor assemblies being formed to enable transmission of the fuse output to the charge when it their second positions.

2. Apparatus according to claim 1 including means for normally disabling said second rotor assembly from rotation, said disabling means being responsive to rotation of said first rotor assembly to enable said second rotor assembly for rotation.

3. Apparatus according to claim 2 wherein said disabling means includes a portion of said first rotor assembly engageable with a portion of said second rotor assembly for preventing rotation of the latter.

4. Apparatus according to claim 2 including means for normally disabling said first rotor assembly from rotation, said first rotor assembly disabling means being responsive to a predetermined spin velocity of the projectile to enable said first rotor assembly for rotation.

5. Apparatus according to claim 1 including means for normally disabling said rotor assemblies from rotation and operable in response to rotation of said projectile to sequentially enable said rotor assemblies for rotation.

6. Apparatus according to claim 1 wherein said offsetting means includes a portion of said first rotor assembly engageable with said second rotor assembly for rotating the latter from its initial position.

7. Apparatus according to claim 1 wherein each of said rotor assemblies includes a rotor, portions of said rotors initially overlying one another and the charge to interrupt trans-

mission of the fuse output to the charge, said rotors having cutout portions, said cutout portions being in alignment one with the other when said rotors lie in said second positions to enable transmission of the fuse output to the charge.

8. Apparatus according to claim 1 wherein said first rotor assembly includes a rotor carrying a pin and a cam, said second rotor assembly including a rotor having a shoulder and a cam follower, means for disabling said first rotor assembly from rotation when said first rotor lies in said initial position, said cam and cam follower being initially engageable with one another for disabling said second rotor from rotation, said first rotor-disabling means being responsive to a predetermined spin velocity of the projectile to enable said first rotor for rotation, said cam and cam follower being disengageable one from the other to enable rotation of said second rotor in response to rotation of said first rotor, said pin being engageable with said shoulder in response to rotation of said first rotor to drive said second rotor.

9. Apparatus according to claim 1 including a third rotor assembly carried by said housing for rotation about an axis substantially parallel to and laterally offset from the spin axis of the projectile, at least a portion of said third rotor assembly being initially located to interrupt transmission of the fuse output to the charge, said third rotor assembly having its center of gravity initially substantially coincident with the spin axis of the projectile, means responsive to the rotation of said second rotor assembly for offsetting the center of gravity of said third rotor assembly from the spin axis of the projectile, said third rotor assembly being thereby rotatable into a second position in response to rotation of said projectile, said third rotor being formed and cooperating with said first and second rotor assemblies in their second positions to enable transmission of the fuse output to the charge when in said second position.

10. Apparatus according to claim 9 including means for normally disabling said second and third rotor assemblies from rotation, said disabling means being sequentially responsive to rotation of said first and second rotor assemblies to enable said second and third rotor assemblies for rotation respectively.

11. Apparatus according to claim 9 wherein said first rotor assembly includes a rotor carrying a pin and a cam, said second rotor assembly including a rotor having a shoulder and a cam follower, means for disabling said first rotor assembly from rotation when said first rotor lies in said initial position, said cam and cam follower being initially engageable with one another for disabling said second rotor from rotation, said first rotor disabling means being responsive to a predetermined spin velocity of the projectile to enable said first rotor for rotation, said cam and cam follower being disengageable one from the other to enable rotation of said second rotor in response to rotation of said first rotor, said pin being engageable with said shoulder in response to rotation of said first rotor to drive second rotor, said third rotor assembly including a rotor having an inset portion along its periphery and a shoulder, said second rotor including a peripheral portion initially engageable with said inset portion carried by said third rotor for disabling said third rotor from rotation, said disabling portions of said second and third rotors being disengageable one from the other to enable rotation of said third rotor in response to rotation of said third rotor, said second rotor including a pin, said second pin being engageable with said third shoulder in response to rotation of said second rotor to drive said third rotor.

12. Apparatus according to claim 11 wherein each of said rotors have portions initially overlying one another and the charge to initially interrupt transmission of the fuse output to the charge, said first and second rotors having cutout portions, said cutout portions being in alignment one with the other when said first and second rotors lie in said second position, said third rotor including a sleeve rotatable therewith, said sleeve being disposed within the cutout portions of said first and second rotors when said third rotor is in said second position to transmit the fuse output to the charge.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,583,319 Dated June 8, 1971

Inventor(s) John O. James

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 9, "mechanism" should read -- mechanisms --; line 31, "portions" should read -- through --. Column 3, line 25, "it s" should read -- its --. Column 4, line 24, after "which" insert -- will --. Column 5, line 44, "rotation" should read -- rotating --. Column 8, line 16, "second rotor" should read -- said second rotor --.

Signed and sealed this 7th day of December 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents

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