Feb. 17, 1970 A. STANGL ET AL 3,495,497

COUPLING MEMBER FOR A MISSILE FIRING AND GUIDING DEVICE

Filed May 15, 1968 3 Sheets-Sheet 1

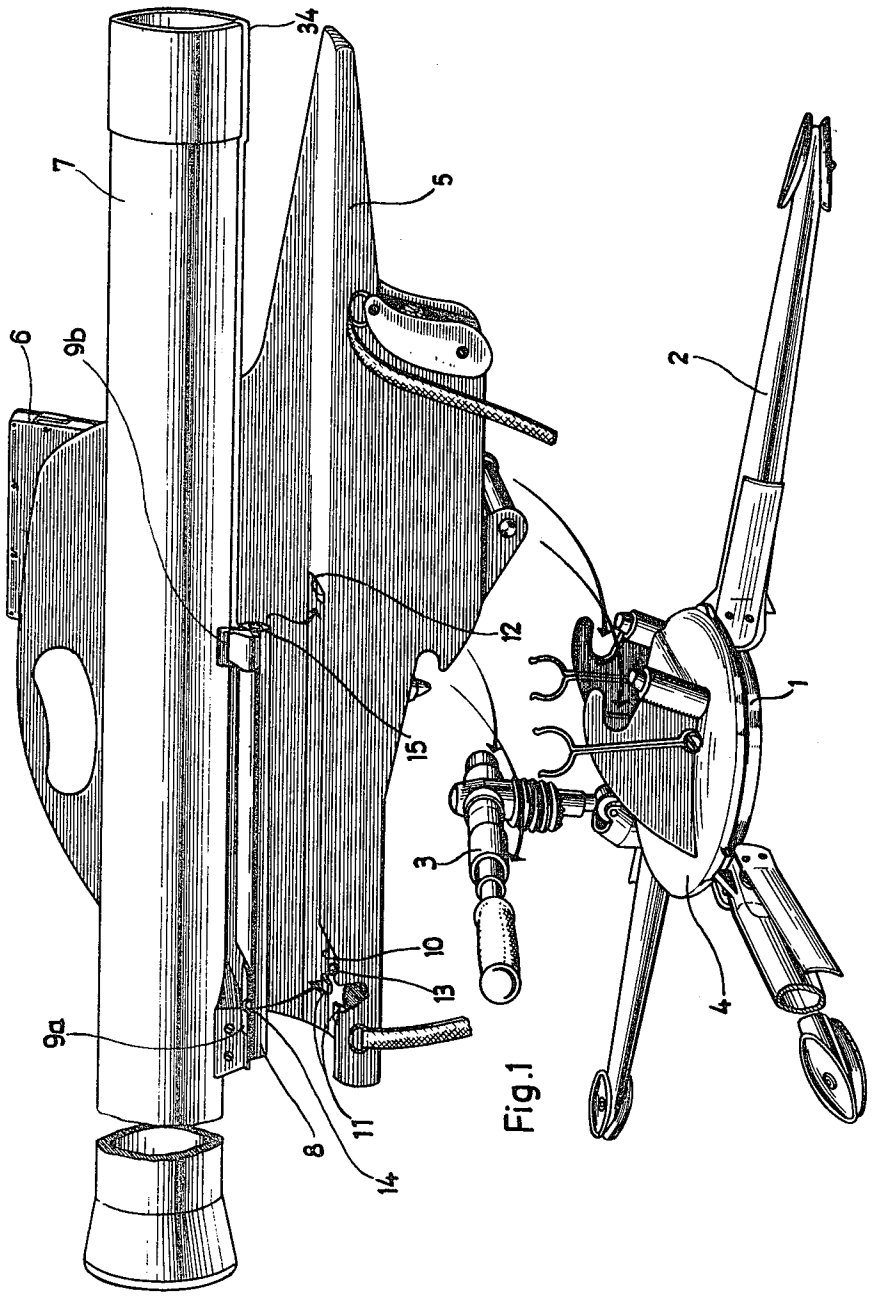

Fig.1

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Filed May 15, 1968 3 Sheets-Sheet 2

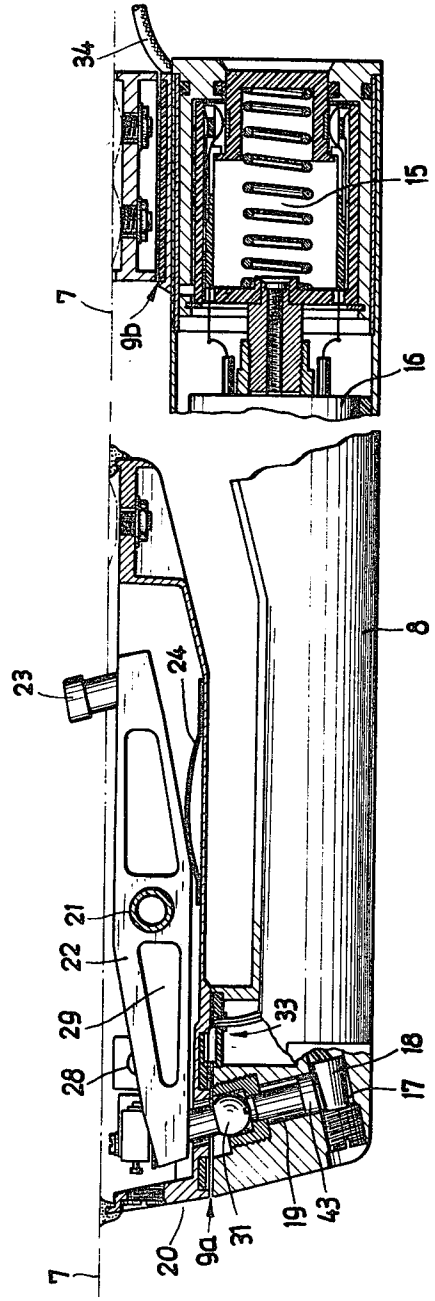

Fig. 2

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COUPLING MEMBER FOR A MISSILE FIRING AND GUIDING DEVICE

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Fig. 3

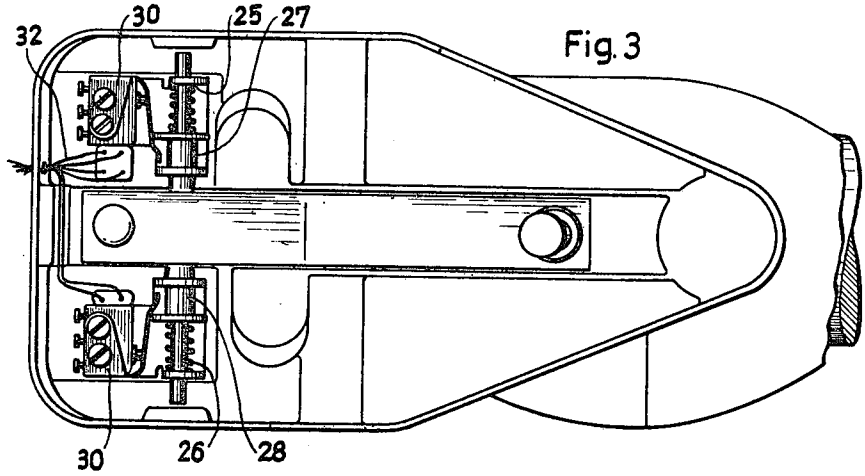
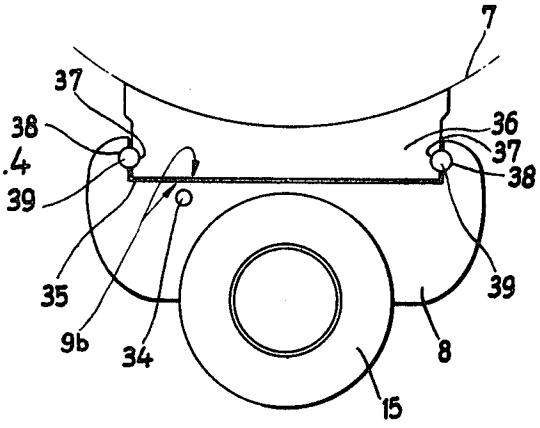


Fig. 4



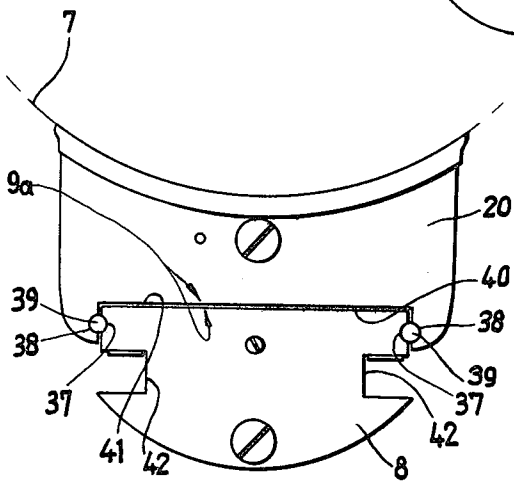


Fig. 5

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United States Patent Office 3,495,497
Patented Feb. 17, 1970

3,495,497

COUPLING MEMBER FOR A MISSILE FIRING AND GUIDING DEVICE

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Filed May 15, 1968, Ser. No. 729,189
Claims priority, application Germany May 19, 1967, B 92,604
Int. Cl. F41f 3/04
U.S. Cl. 89—1.815 15 Claims

ABSTRACT OF THE DISCLOSURE

A coupling arrangement for a missile firing and guiding device is formed of a coupling member and locking device for attaching a firing tube and missile to a support element. A three-point attachment is provided between the coupling member and the support element for absorbing the various forces acting on the coupling member during missile firing. After firing, the firing tube is displaceable from the coupling member and the coupling member is removable from the support element. For each missile fired, a new coupling member and firing tube is mounted on the support element.

SUMMARY OF THE INVENTION

The invention is directed to a firing and guiding device for guided missiles and, more particularly, to a coupling member for securing the missile to a support element containing the firing and guiding means. During its firing and flight period, the missile is guided, either with or without a wire connection, by the firing and guiding means contained within the support element.

The missile can be connected directly to the firing and guiding device or it can be mounted in position while disposed within a firing tube. Where a firing tube is used it also serves as the packing or carrier for the missile. The connection to the firing and guiding device must be sufficiently rigid to permit the missile to follow all the directing movements of the firing device without any relative movement between the two. Further, the connection means must be capable of detachment from the support element of the firing and guiding device immediately after firing without being influenced by the forces acting on the missile.

Since the connection or coupling member forms a part of the missile firing weapon, it must afford exact alignment for the missile with the firing and guiding means under all environmental and weather conditions. Moreover, the overall device must be easy and safe to handle, especially during the loading operation, that is, when placing the missile, either with or without its firing tube, on the firing device.

However, the means required for exact alignment and low-friction separation of the missile upon launching render the loading operation difficult. Strongly designed equipment for supporting and securing the missile in position for insuring simple and rapid loading operations is limited by the requirements for exact alignment of the missile on the firing device.

Another problem experienced in the past has been the detachment or separation of the missile from the firing device. When the missile is launched, variable acceleration forces are developed because of the dependence of the thrust on prevailing atmospheric conditions and unavoidable structural inaccuracies and they tend to cause jamming in the guiding means. Such a condition is particularly dangerous for the person operating the firing device if he happens to be within close range of the missile, except in instances of relatively large firing devices located outside an armored protection, as illustrated in U.S. Patent No. 3,095,780.

For effective operation, the reaction forces developed upon separation of the missile from the firing device should be as small as possible. Where a large number of missiles must be launched from a firing device without any deviation in the launching operation, it is necessary that no inaccuracies caused by wear be developed particularly in the parts of the coupling member secured to the support element or firing device. This condition is especially true for missiles to be guided to a target semi-automatically by the so-called target covering method. In this method, the missile must be picked up immediately after it is launched by a position finder whose output voltages represent the location coordinates of the missile. Since the pick-up range of such position finders is small, for example, in the range of plus or minus 2°, any small inaccuracies or deviations occurring during launching may prevent the proper pick-up of the missile by the position finder.

In the situations where the missiles are launched from a firing tube which also acts as the packing for the missile, the coupling member connecting the firing tube with the support element must have a locking means which is capable of releasing both the missile from the firing tube and the firing tube from the coupling member at the correct times during the launching operations. Another problem is the provision for electrical connections between the missile and the firing device, such connections include ignition circuits and circuits for transmitting guiding signals to the missile in flight. It will be appreciated, of course, that the guiding circuits remain in use during the flight of the missile.

Accordingly, it is the primary object of the present invention to provide a coupling member for securing the missile, either with or without its firing tube, to the support element or firing device in a manner which assures accurate launching and guiding of the missile each time the device is fired.

Another object of the invention is to provide a missile device which can be carried and handled by one person.

Still, another object of the invention is to provide a coupling member which provides properly aligned connection of each missile mounted on the firing device.

Moreover, another object of the invention is to assure low friction detachment of the missile from the firing device.

Yet, another object of the invention is to afford missile firing and guiding equipment which can be easily and safely handled during battle conditions with its attendant physical and pyschic strain.

A further object of the invention is to provide a locking member for securing the missile and its firing tube in position prior to launching and for releasing the missile and the firing tube properly during launching operations.

Another object of the invention is to supply an arrangement for the detachment of the firing tube after the missile has been launched and also for the removability of the coupling member after the displacement of the firing tube.

Another particular object of the invention is to provide a three-point attachment or connection of the coupling member to the support element to absorb the various forces acting on the coupling member during launching operations without any adverse effects.

Yet, another object of the invention is to afford switch and circuitry means in combination with the locking device for properly igniting the missile when it is released from its locked position within the firing tube.

Moreover, another object of the invention is to supply a battery within the coupling deivce for assuring proper operation of the various circuitry means each time a missile is lanuched.

Still, another object of the invention is to provide an interlocking engagement between the firing tube and the coupling member to assure proper slidable disengagement of the tube after the missile has been launched.

A further object of the invention is to afford an arrangement for disengaging the firing tube from the coupling member which does not provide any possibility of opposing sections becoming locked or jammed during disengagement.

Therefore, the present invention provides a coupling member to which the missile and its firing tube is releasably attached and which can be mounted on the support element containing the firing and guiding means through a three-point attachment arrangement.

In this arrangement, for each missile fired, a new coupling member is employed which avoids any problem of fouling and damage as a result of previous launching operations or the occurrence of temperature differences between the missile and the guiding means. Due to this arrangement, a previously unattainable reliability for missile launching operations has been achieved.

As indicated in Patent No. 3,146,670, it is already known to employ coupling components connected to the missile before launching which effect the guiding of the missile in a slide track located on the firing device. In such an arrangement, during launching, the missile is released by means of the destruction of a shear pin which releases the missile from the coupling members, and thereby avoids any aerodynamic influence or excessive weight of the missile. These previously known coupling members, however, are reused for each missile that is to be launched and where large numbers of missiles are fired the disadvantages mentioned above occur.

In the present invention, the coupling member combines one part secured to the firing tube and a second part attached in a three-point arrangement to the support element of the missile firing device. The points or areas of separation between the two parts are under stress only during the separation of the missile from the firing device. Accordingly, the parts can be made of very low-friction materials since each coupling member is used only once and accordingly wear resistance is of minor importance.

After the missile has been launched and its firing tube detached, the remainder of the coupling member can be removed and this may be done, preferably, by automatic means such as a accumulator. When the missiles are launched from a firing tube, the coupling member securing the firing tube to the firing and guiding device is comprised of two parts. The first part is a lock member attached to the firing tube and to the second part. The second part, also attached to the firing tube, is secured in a three-point attachment to the support element of the firing and guiding device. The first part includes a mechanical locking device which prevents any movement of the other parts of the device until the missile is launched. Further, the coupling member is arranged to remain in locked engagement until the missile is fired and a desirable rotation is given it as it is ejected from the firing tube. In this arrangement, as the missile is launched from the tube, the tube is displaced from the coupling member simultaneously in a direction opposite to the firing direction. The securement of the firing tube to the coupling member during launching assures an adequate longitudinal rotation for the missile, such as is accomplished by rifling the interior of the firing tube.

Another feature of the invention is the use of latch means for securing the locking device to the coupling member and the firing tube and missile. Incorporated into the coupling member is an explosive charge for releasing the latch means. When the explosive charge unlatches both the missile and the firing tube, the firing tube is still restrained against any rotational movement. To afford a relatively long base in the longitudinal direction for the firing tube on the coupling member, while maintaining the minimum interengagement of their opposing parts, the guide track for the separation of the firing tube from the coupling member is divided into two spaced parts. The two points or surfaces of separation of the firing tube and the coupling member are arranged so that the firing tube can be displaced oppositely from the firing direction of the missile in an undisturbed trajectory.

In a preferred embodiment of the invention, the separation surfaces of the firing tube and the coupling member are disposed in a groove and slide arrangement with cylindrically-shaped pins arranged in opposed semi-circular-shaped grooves to assist in the separation operation. To maintain a minimum friction between the separating parts, the pins are preferably made of tetrafluorethylene. In this arrangement, the oppositely facing surfaces of the firing tube and the coupling member in the groove and slide arrangement and the cylindrically-shaped pins are covered with a protective film to protect them from dirt and moisture during long periods of storage and also from the conditions existing under battle situations. The protective film is destroyed as the missile is launched for effecting the efficient operation of the separation surfaces. In the firing direction, the rear separation surfaces provide a groove in the firing tube within which the coupling member slides while the forward separating surfaces afford a groove in the coupling member and a slide provided by the firing tube. In this arrangement, as the firing tube is displaced rearwardly, there is no likelihood that the different contacting surfaces will become accidentally engaged or jammed at the rear point of separation between the coupling member and the firing tube.

However, if a missile is directly connected to the coupling member, that is, without a firing tube, then the arrangement of the parts carrying the guiding members of the slide and grooved sections are reversed since the missile travels in the opposite direction from that of the firing tube.

Further, another feature of the invention is the disposition of the forward separation surfaces of the coupling member at a higher elevation than the rearward contacting surfaces for avoiding any likelihood of jamming between the firing tube and the coupling member when it is being displaced from the firing device. This feature is of particular importance in avoiding any danger to the person operating the device during the launching operations.

The three-point attachment of the coupling member with the supporting element is arranged so that each bearing point is essentially stressed in only one direction and is arranged to absorb one of the series of forces acting on the coupling member during the missile launching operation.

In the three-point attachment arrangement forces which occur perpendicularly to the longitudinal axis of the coupling member are absorbed by a plug connection located at the forward face of the coupling member and may also be assisted by the two sliding guides on the support element which engage grooves in the coupling member. The slide guides and grooves located at the rearward portion of the coupling member also absorb any torque or rotational movement about the longitudinal axis of the coupling member. The forces acting in the longitudinal direction of the coupling member are absorbed by a retractable knob on the support element which engages in a recess in the coupling member, further the knob establishes the locking engagement of the coupling member with the support element of the firing device.

The plug connection between the coupling member and the firing device affords the additional advantage of forming the electrical connection between the missile and the firing and guiding means and may contain an accumulator for releasing the coupling member from the support ele-

ment after the completion of the launching and guiding operations.

Still another advantage of the coupling member is the incorporation of an activated battery into its structure for providing the current supply for the guiding device. In accordance with this characteristic of the coupling member, the reliability of the entire weapon system is increased since a new battery is employed for each missile launching.

Since one of the points of attachment of the coupling member to the firing device is provided by an electric plug connection, when the coupling member and the missile are mounted on the firing and guiding device, the necessary electrical connections are established. In the instance of guidance signal transmission by means of a wire, the wire extends between the missile within the firing tube and the coupling member and, after launching when the coupling member is detached from the firing and guiding device, the device is ready for another missile without requiring any additional wiring connections.

The connection between the firing tube and the coupling member is provided by a mechanical locking device. The locking device consists of a rocker-type lever having a first latch at one end secured into the firing tube for holding the missile in place, at its other end, the lever has a second latch which is engaged within a bore in a rearward portion of the coupling member. A pair of spring loaded pawls are mounted in the rocker-type lever and are arranged to close microswitches for activating the electric circuits of the firing device when the latches are released. Within the bore in the coupling member, an exposive charge is located for displacing the rocker lever into its unlatched position for releasing the missile and firing tube.

During storage and transportation, the mechanical locking device holds the missile in position in the firing tube. It is released only when the missile is ready for firing. Further, the arrangement of the locking device provides not only for the release of the missile and the firing tube from the coupling member but it also affords the actuation of the electric circuit for the missile launching operation.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a simplified representation of the present invention illustrating the parts of the firing and guiding device in a separated arrangement;

FIG. 2 is a side view, partly in section, through the coupling member and locking device;

FIG. 3 is a top view of the locking device, as shown in FIG. 2; and

FIGS. 4 and 5 are end views of the surfaces of separation between the coupling member and the firing tube.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1, a missile firing and guiding device is illustrated with the different elements forming the device shown in a separated arrangement. A portion of the supporting element of the device is formed by an under-frame **1** to which are attached tripod legs **2**. The under-frame **1** is adjustable in both the elevational and traverse directions through devices **3** and **4**, however, since these devices do not form a part of the invention they are not described in detail. Connected to the under-frame **1** and forming a part of the support element of the device, is a sight support **5** which contains a sight **6** and means required for tracking and guiding the missile, however, these parts are not shown in detail since they do not form a part of the invention as such. The ammunition package consists of a firing tube **7** which is secured to the sight support **5** by means of a coupling member **8**. A missile, not shown, is positioned within the firing tube. The firing tube and the coupling member are provided with separation surfaces **9***a*, **9***b* which are described subsequently. As viewed in FIG. 1, the righthand end of the firing tube faces in the firing direction. In the assembled position, the coupling member **8** is inserted in the firing direction into a bowl-shaped recess **10** in the sight support **5** and is guided into position by the sliding guides **11** at the rear of the recess **10** and an electrical plug connection **12** at its forward end. A spring loaded knob **13** located toward the rear of the recess **10** provides a locking engagement with a recess **14** in the coupling member **8**. At its forward end, the coupling member **8** has a plug connector **15** which engages the electrical plug connection **12** in the sight support **5**, note the plug **15** shown in FIG. 2 and the arrow in FIG. 1 which indicates the manner in which the plug **15** is inserted into the plug connection **12**.

Located within the coupling member **8** is an activatable battery **16** whose contacts are connected with corresponding electrical contacts of the plug receptacle **15**. Further, as shown in FIG. 2, in the rearward portion of the coupling member **8**, an explosive charge **18** is located within a bore **17** and a piston **43** is positioned within a bore **19** disposed generally perpendicularly to the bore **17**. At the opposite end of the bore **19**, mounted on top the coupling member **8** is a mechanical locking device **20**.

Mechanical locking device **20** consists of a rocker-type lever **22** rotatable about an axis **21** located transversely of the longitudinal axis of the coupling member **8**. At its forward end an upwardly disposed first latch **23** extends through an opening in the firing tube **7** and is secured within the tube into a recess in the missile. These features are not shown in the drawings. In this manner, the first latch in engaged position secures the firing tube and the missile in position on the firing and guiding device. At the opposite or rearward end of the lever **22** a second latch **31** extends downwardly and has a spherical end engaged within the upper end of the bore **19** in the coupling member. Accordingly, at its forward end, the latch **23** secured the locking device to the firing tube and missile and at its rearward end it secures the locking device to the coupling member **8**. In this arrangement, as shown in FIG. 2, a leaf spring **24** attached to the housing of the locking device maintains the latch means within their engaged positions. It will be noted that at the rearward end of the coupling member the area or surfaces of separation **9***a* are provided between the locking device **20** and the coupling member **8**.

In FIG. 3, located on opposite sides of the lever **22** are pawls **27** and **28** loaded by helical springs **25** and **26**. These pawls **27** and **28** are arranged to engage in a recess **29** in the lever when the lever is rocked about its axis **21** into the unlatched position. In the unlatched position, the pawls are urged by means of their helical springs into the recess **29** for holding the lever in its unloaded position, and at the same time actuate the microswitches **30** mounted in the locking device. The microswitches **30** close the ignition circuits for the launching of the missile. The contacts of the microswitches **30** are connected through lines **32** with the firing tube **7** and the missile contained within it and, in addition, by means of disengageable electric contacts **33**, note FIG. 2, with the coupling member **8**. The contacts **33** may be replaced by sliding electrical contacts which provide the electrical connection between the mechanical locking device and the coupling member.

The previously mentioned areas or surfaces of separation **9***a* and **9***b* are shown in detail in FIGS. 4 and 5 and it will be noted that they are constructed differently in the forward position, that is, FIG. 4 illustrating the surface of separation **9***b* and the rearward position shown in FIG. 5 exhibiting the other surface of separation **9***a*.

In FIG. 4, the forward portion of the coupling member **8** is shown connected to the firing tube **7**. The upper surface of the coupling member **8** is arranged to provide a rectangularly-shaped groove **35** which receives a slide **36** formed on the lower portion of the firing tube **7**. The groove **35** and the slide **36** which form the surfaces of separation **9***b* are provided with a space between their opposed faces. In the sides of the groove **35** and the slide **36**, semi-circular-shaped grooves **37**, **38** are formed into which cylindrically-shaped pins **39** are inserted which act as the retaining and guiding means between the coupling member and the firing tube. Positioned in the lower portion of the coupling member, as illustrated in FIG. 4, is the plug receptacle **15** and the guide wire **34** which extends forwardly into the firing tube **7**, see FIG. 1.

As shown in FIG. 5, at the rearward portion of the firing tube **7** and the coupling member **8**, the separation surfaces **9***a* are disposed in a similar fashion to that shown in FIG. 4, however, the positions of the groove and slide members are reversed. At its rearward portion, the locking device **20** is secured to the firing tube and its downwardly facing surface is provided with a rectangularly-shaped groove **41**. The upwardly directed portion **40** of the coupling member **8** is arranged as a slide member to fit within the groove **41** in the locking device. As with the separation surfaces **9***b*, the oppositely facing surfaces of the groove **41** and the slide member **40** are spaced apart and semi-circular grooves **37** and **38** are formed in the opposite side surfaces of the groove and slide member and cylindrically-shaped pins **39** are disposed within these grooves and form the individual guiding and retension means between the slide member **40** and the groove **41**. In the side surfaces of the coupling member **8** below the slide member **40** are a pair of oppositely facing grooves **42** arranged to fit in engagement with the sliding guides **11** in the sight support **5**, see FIG. 1.

In FIG. 2, it will be noted that the separation surface **9***b* is disposed vertically above the separation surface **9***a*. In addition to this difference in elevational height, as was mentioned previously, the arrangement of the grooves and slides on the firing tube **7** or its locking device **20** and on the coupling member **8** are reversed between separation surfaces **9***a* and **9***b*. With this arrangement of the separation surfaces, when the firing tube is displaced from the coupling member upon the launching of the missile, it moves in the rearward direction and the arrangement of the grooves and the difference in elevational heights assure that the firing tube does not become seized upon or jammed with the oppositely disposed surfaces of the coupling member and it is easily and simply displaceable from the firing and guiding device. Due to this relative arrangement of separation surfaces a safe manner of displacement of the firing tube is provided particularly with regard to the safety of the person handling the firing and guiding device. However, if the missile is launched from the coupling member without the use of a firing tube, the disposition of the separation surfaces would be reversed with respect to that shown in FIG. 2 and FIGS. 4 and 5 to assure that there is no jamming or seizing of the opposing surfaces as the missile is launched. Since the missile is disengaged in the direction opposite to the disengagement of the firing tube, the reason for this is apparent.

The dimension of the separation surfaces **9***a*, **9***b* are of sufficient length in the longitudinal direction to assure that the cylindrically-shaped pins **39** remain in engagement within the grooves **37**, **38** during the launching of the missile and the resulting backward movement of the firing tube until the missile has received a sufficient rotational twist. This twist, if it is desired at all, is brought about in the usual case by rifling on the interior of the firing tube which, however, can influence the missile only if the firing tube is secured against rotation about its longitudinal axis.

DESCRIPTION OF THE OPERATION OF THE INVENTION

During the loading operation of the firing and guiding device the ammunition assembly consisting of the firing tube **7**, the missile disposed within the tube, and the coupling member **8** are inserted into the sight support **5** by the person operating the device with the forward end of the coupling member, that is, the plug receptacle **15**, inserted into the plug connection **12** of the sight support **5**. Additionally, the knob **13** on the sight support is fitted into the recess **14** in the coupling member and the sliding guide **11** on the sight support fit within the grooves **42**, see FIG. 5, on the coupling member. These three points of connection between the coupling member and the sight support provide structure for absorbing all of the various forces acting on the coupling member during the missile launching operation.

The connection between the plug parts **12** and **15** absorb the forces acting substantially normal to the longitudinal axis of the coupling member, the connection formed by the sliding guides **11** on the sight support and the grooves **42** in the coupling member absorb the rotational or torque forces acting on the coupling member. Finally the interconnection of the knob **13** in the sight support and the recess in the coupling member absorb all the forces acting in the longitudinal direction of the coupling member. Thus, each of the individual points of connection between the coupling member and the sight support are intended to absorb only one type of force of the coupling member, though it is possible for the sliding guides **11** in groove **42** to absorb two different types of forces. Accordingly, because of this construction, the coupling member and its points of engagement with the sight support may embody relatively large tolerances.

The battery **16** is disposed within the coupling member **8** provides the current supply for the electronic and electric devices located within the sight support and employed in the launching, tracking and guiding of the missile. The missile disposed within the firing tube is electrically connected with the coupling member through the guide wire **34** and through the electrical plug connection **15** with the sight support **5**.

When the means, not shown in the drawings, for actuating the missile launching equipment are triggered, the explosive charge **18** located in the coupling member is electrically ignited and creates a pressure wave which drives the piston upwardly within bore **19** and displaces the latch **31** out of the bore **19**, against the force of the leaf spring **24**. The action of the latch **31** being moved upwardly within the bore **19** rocks the lever **22** about its axis **21** and displaces the latch **23** from its position locking the missile in place within the firing tube. In addition to releasing the missile, the latch **23** when moved downwardly also releases the firing tube **7**. As the rearward end of the lever **22** tilts upwardly, the pawls under the urging of the helical springs **25** and **26** are engaged within the recess **29** in the lever and hold the lever in the disengaged position. As the pawls **27** and **28** are inserted into the recess **29**, the microswitches **30** are actuated and the electric ignition circuits for the launching of the missile are closed. By means of the microswitches, a gyro system for the position control of the missile is actuated by a power propelled charge, and a flare charge for tracking the missile also is ignited.

In addition to the missile, a gas generator is usually contained within the firing tube and it is also ignited by the microswitches and the pressure it produces drives the missile out of the firing tube and ignites the missile propulsion mechanism. The arrangement of the missile and the firing tube **7** is such that as the missile is launched, the firing tube receives an acceleration force in a direction opposite to the firing direction and the firing tube detaches from the coupling member at the separation surfaces **9***a*, **9***b* and it is displaced rearwardly from the firing and guiding device.

Accordingly, after the missile is launched, only the coupling member remains connected to the sight support of the firing and guiding device. During its flight, the missile is connected to the coupling member by the guide wire and it is directed to the target by means of signals transmitted through the guide wire from the guiding device.

When the missile reaches its target or when the flight time for the missile is completed, and the knob **13** is released from the recess **14**, the coupling member may be ejected either by hand or automatically by means of an accumulator, not shown, disposed within the electric plug connection. When the coupling member **8** is detached from the sight support **5**, the guide wire **34** is detached and the battery **16** located within the coupling member **8** is removed. Since the reloading of the firing and guiding device can be performed only after the removal of the coupling member **8** from the sight support, each time a new missile is loaded a new battery supplying current to the guiding device and a new guide wire is secured for attaining the effective operation of the missile firing and guiding device.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. In a device for firing and guiding missiles, including a support device containing firing and guiding means, the improvement comprising a longitudinally extending coupling device detachably secured to said support device, a missile firing mount detachably mounted on said coupling device, and a first means, a second means and a third means, each arranged to provide a detachable engamement between said coupling device and said support device, said first means being arranged to absorb forces acting substantially normal to the longitudinal axis of said coupling member, said second means being arranged to absorb rotational forces acting about the longitudinal axis of said coupling member, said third means being arranged to absorb forces acting in the direction of the longitudinal axis of said coupling device whereby as the missile is fired said missile firing mount is detached from said coupling device and after the missile firing has been completed said coupling device is detachable from said support device for replacement by a new missile firing mount and coupling device for firing another missile and wherein said first, second and third means provide a three point attachment between said coupling device and said support device so that each said means at the points of attachment are essentially stressed in only one direction and absorb one of the series of forces acting on said coupling device during missile firing.

2. In a device, as set forth in claim **1**, wherein means being arranged for releasably locking said missile firing mount to said coupling member, said means comprising a locking device attached to said missile firing mount, said locking device comprising a lever extending in the longitudinal direction of said coupling device and being arranged to pivot about an axis disposed transversely of the longitudinal axis of said coupling device, said lever being positionable between a first position in engagement with said coupling device and the missile positioned on said missile firing mount and a second position released from said coupling device and the missile, in the first position a first latch on said lever is arranged to secure the missile in position and a second latch longitudinally spaced from said first latch is engaged in locking relationship in said coupling device.

3. In a device, as set forth in claim **2**, wherein said first latch projects obliquely from one end of said lever which is spaced longitudinally from the axis thereof and said second latch projects obliquely from said lever in a direction opposite to that of the direction in which said first latch projects and said second latch being spaced longitudinally from said first latch and being positioned on the opposite side of the axis of said lever from said first latch, and a spring member for urging said first latch and second latch into locking engagement with the missile and said coupling member, respectively.

4. In a device, as set forth in claim **3**, wherein said second latch is engaged within a bore in said coupling, an explosive charge disposed within the bore in said coupling member containing said second latch, a piston member disposed in said bore between said explosive charge and said second latch, whereby upon exploding the charge said piston member is forced against said second latch and said second latch is released from said coupling member thereby pivoting said lever and releasably displacing said first latch from the missile.

5. In a device, as set forth in claim **4**, wherein said lever has a recess therein, a pair of spring biased pawls cooperating with said lever and arranged to be urged into said recess when said lever is rotated into its second position, and said pawls arranged ot hold said lever in its second position.

6. In a device, as set forth in claim **5**, wherein microswitch means are positioned within said locking device and are arranged to close the ignition circuit in the support device containing firing and guiding means when said pawl means are engaged in the recess holding said lever in the second position.

7. In a device, as set forth in claim **2**, wherein said missile firing mount comprises a first section and a second section disposed in longitudinally spaced relationship relative to the longitudinal axis of said coupling member, and each of said sections arranged in slidable engagement with said coupling device.

8. In a device, as set forth in claim **7**, wherein in the firing position said missile firing mount is positioned above said coupling device and said first section is arranged to depend downwardly from said missile firing mount, said coupling device having a groove formed in its upwardly facing surface disposed in opposed relationship to said first section and arranged to receive said first section therein in slidably releasable engagement.

9. In a device, as set forth in claim **8**, wherein the oppositely facing side surfaces of said groove in said coupling member and said first section have oppositely disposed facing, aligned semi-circular grooves, and a cylindrically-shaped rod member disposed within said semi-circular grooves for retaining said missile firing mount within said coupling device and for affording sliding relationship between said missile firing mount and said coupling device during disengagement of the firing mount from the coupling device.

10. In a device, as set forth in claim **9**, wherein said second section of said missile firing device incorporates said locking member and extends downwardly from said missile firing member and forms a longitudinally extending groove in its lower surface, said coupling member having an upwardly directed slide section arranged to fit within the groove in said second section, the opposed surfaces of said groove in said missile firing member and of said slide section of said coupling member disposed in closely spaced relationship, longitudinally extending semi-circular grooves formed in the opposed sides of said groove and slide section, and cylindrically-shaped rods disposed in said grooves for retaining said coupling member and said missile firing mount in engagement and for affording sliding relationship therebetween as said firing member is disengaged from said coupling member.

11. In a device, as set forth in claim **10**, wherein when arranged in the firing position the lower surface of said first section of said missile firing device is spaced above the lower surfaces of said second section of said missile firing device for affording disengagement of said missile firing mount from said coupling member without obstruction or jamming of the opposed surfaces.

12. In a device, as set forth in claim 1, wherein a battery is positioned within said coupling device and is arranged to provide current for operating the firing and guiding means.

13. In a device, as set forth in claim 1, wherein said first means comprises an electrical plug connector having its axis disposed in parallel relationship with the longitudinal axis of said coupling device and being connected to said battery, and a mating electrical connector member in said support device arranged to receive and be interconnected with said electrical plug connector.

14. In a device, as set forth in claim 1, wherein said second means comprises grooves extending in the longitudinal direction in said coupling member, and sliding guides secured to said support device and extending transversely of the longitudinal axis of said coupling device and being arranged to fit in sliding engagement within said grooves.

15. In a device, as set forth in claim 1, wherein said third means comprises a recess in said coupling member

having its axis disposed perpendicularly to the longitudinal axis of said coupling device and a spring loaded knob in said support device extending perpendicularly to the longitudinal axis of said coupling device and arranged to fit in interlocking engagement within said recess in said coupling member.

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U.S. Cl. X.R.

89—1.816