

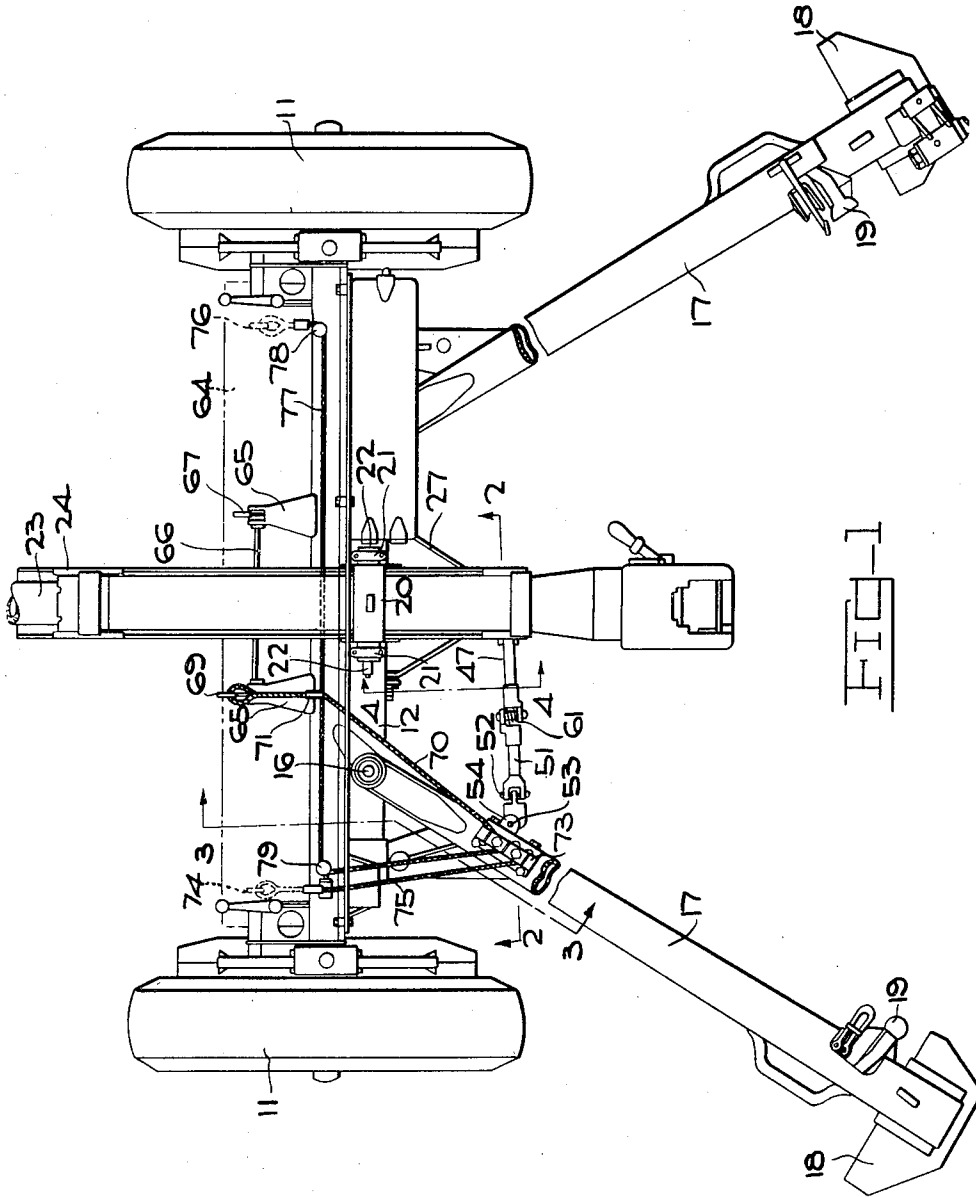
March 21, 1950

J. P. O'SULLIVAN
TRAVEL LOCK AND MOVABLE SHIELD
PLATE FOR FIELD GUN MOUNTS

2,500,959

Filed June 28, 1945

4 Sheets-Sheet 1



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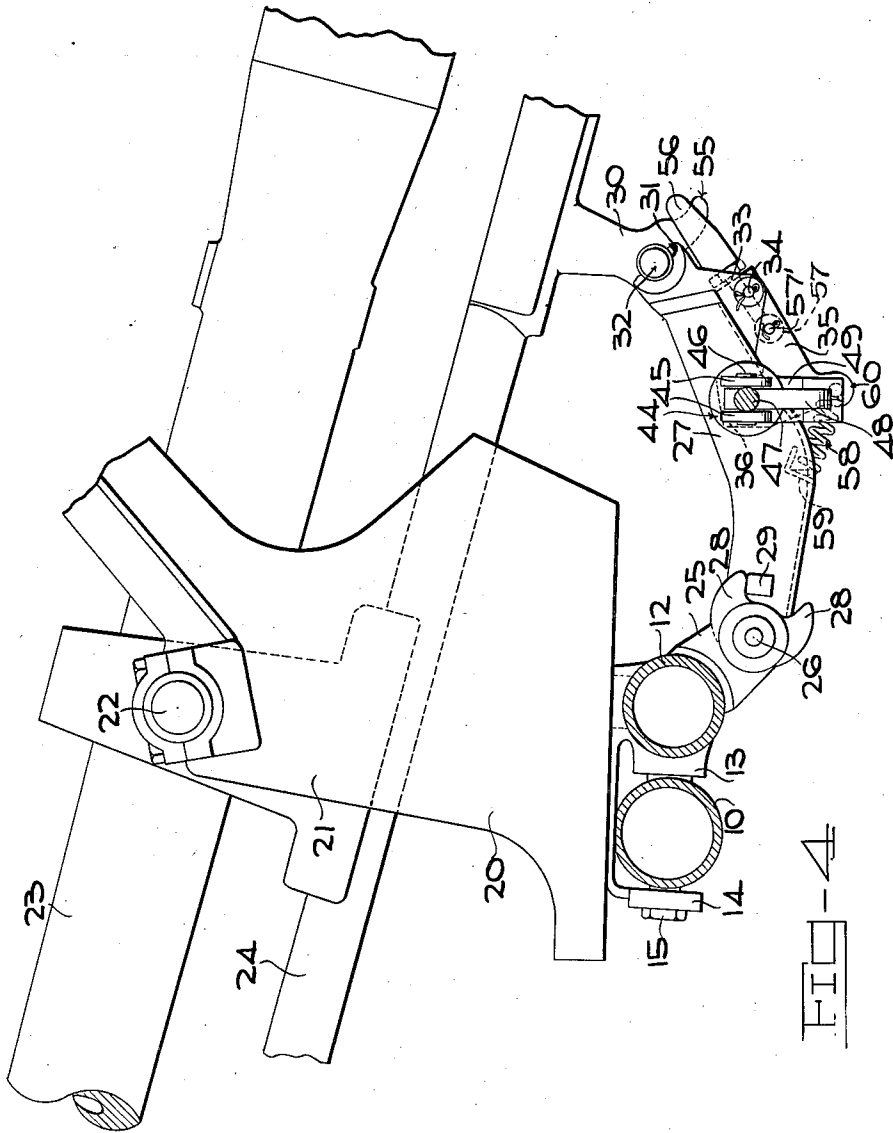
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Fig. 7.

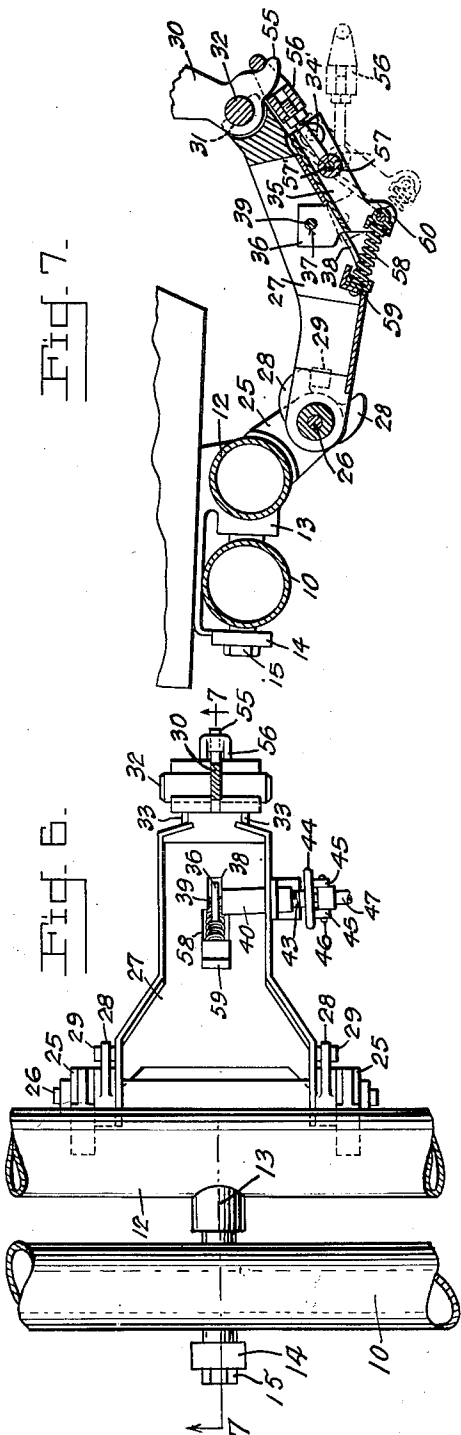


Fig. 6.

Fig. 8.

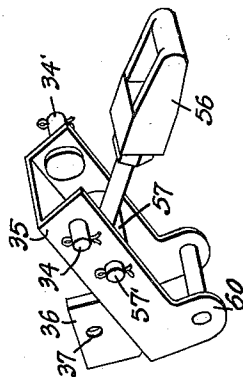
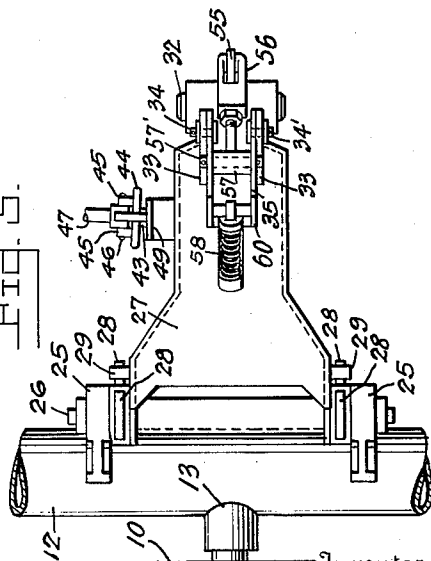


Fig. 5.



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TRAVEL LOCK AND MOVABLE SHIELD PLATE FOR FIELD GUN MOUNTS

John P. O'Sullivan, Brooklyn, N. Y.

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a gun carriage and more particularly to a wheeled artillery piece of the type having a split trail and other components that are arranged for movement into and out of various positions according to whether the piece is being transported or emplaced.

In the usual artillery piece of the type referred to, the weapon includes a main frame having a pair of trails arranged for movement together when the weapon is being towed and for spreading when the weapon is prepared for firing, the trails in the latter position providing support for the weapon. When the piece is being towed or transported, the gun tube and cradle assembly is locked to the main frame by a traveling lock. Other components of the weapons such as the aprons and shields are likewise folded to facilitate transport. When the weapon is emplaced for firing, these various components must be moved to firing positions; that is, the traveling lock must be released so that the tube and cradle assembly may have free movement in traverse or elevation and depression and the aprons and shields must be arranged in positions affording the desired protection to the gunner and to the piece itself.

A weapon of this type, that is, one that is not self-propelled, presents many problems limiting its maneuverability and consequently it has heretofore required considerable time to position the weapon for firing, inasmuch as several operations were involved, including the operation of various latches and connections and to dispose the various components of the weapon in firing positions. According to the present invention, these difficulties have been substantially eliminated and the time required for emplacement greatly reduced.

The principal object of the present invention is to provide an artillery weapon of the type referred to in which the positioning of certain parts for firing will automatically result in arranging other parts of the weapon in firing position.

It is an important object of the invention to provide, in a weapon having split trails, means connected to at least one of the trails for actuating other components of the weapon upon spreading of the trails when the weapon is emplaced. It is specifically an object of the invention to release the traveling lock and armor apron of the weapon upon spreading of the trails and

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to effect movement of the lock and armor to battery positions automatically.

It is another object of the invention to connect the apron and traveling lock, or like components, to the trails in such a manner that when the trails are closed and the weapon arranged for transport, the armor apron will be restored to its traveling position and the traveling lock will be disposed in such a manner that reconnection thereof to the tube and cradle assembly will be facilitated.

The invention has for another object the provision of means of the type referred to that may be incorporated in a standard artillery piece without essentially modifying the basic construction thereof, so that the modification may be easily made in the field.

Other objects and important features of the invention will become apparent from the following detailed description of a preferred embodiment of the invention as shown in the accompanying sheets of drawings in which:

Fig. 1 is a plan view of an artillery weapon embodying one form of the invention, the piece being emplaced;

Fig. 2 is an enlarged transverse sectional view taken substantially on the line 2—2 of Fig. 1 and illustrating the connection between one trail and the traveling lock of the weapon at the instant of release of the plunger 39 from the locking member 35, the view illustrating in broken lines the positions of the parts when the trail is in closed position and at the instant the locking member is forced upward with its opening 37 aligned with the plunger 37.

Fig. 3 is an enlarged, longitudinal, fragmentary sectional view taken generally on the line 3—3 of Fig. 1 and showing the apron or firing shield in transport position in full lines and in battery position in broken lines;

Fig. 4 is an enlarged vertical longitudinal sectional view taken substantially on the line 4—4 of Fig. 1 and showing the arrangement between the axle and support of the weapon and the tube and cradle assembly and traveling lock.

Figure 5 is a bottom view of the travel lock as illustrated in Figure 4.

Figure 6 is a top view of the parts shown in Figure 5;

Figure 7 is a sectional view taken on line 7—7 of Figure 6;

Figure 8 is a perspective view of the locking member.

As previously stated, the piece chosen for the purposes of illustration is of standard construc-

tion and the invention has been illustrated in connection therewith. It should be understood, of course, that the invention itself may assume many forms and that it may be variously applied to different types of weapons. Accordingly, the disclosure herein is to be taken as intended only for purposes of illustration.

The artillery piece or weapon illustrated comprises a transverse axle 10 journalling wheels 11 at its opposite ends. A transverse support 12 is disposed rearwardly of and generally parallels the axle 10 and is connected to the axle 10 by means of bracket structure 13. The bracket 13 includes a forward extension which has a depending ear 14 through which is passed a pivot pin 15 for the purpose of mounting the support 12 on the axle 10 for vertical oscillation about a longitudinal horizontal axis through the pin 15. The support 12 is provided at transversely spaced points thereon with vertical pivot members 16, only one of which is shown in Fig. 1, to each of which is pivotally connected the forward end of a rearwardly extending trail 17. These trails include at their rearward ends spades 18 and latch means 19 for latching the trails together when the trails are closed for transporting of the weapon. The rearward end of one of the trails may be provided with a lunette in the usual manner by means of which the piece may be towed behind a prime mover.

The supporting structure comprising the support 12 and bracket 13 carries rigidly thereon a frame member 20 including a pair of upstanding side supporting members 21 which support on trunnions 22 a tube and cradle assembly comprising a gun tube 23 and cradle 24. The structure just described may be of conventional design and has therefore not been illustrated in detail.

The piece is provided with a traveling lock, which may also be of conventional construction, for locking the tube and cradle assembly against swinging movement through traverse or elevation and depression while the piece is being towed. As best shown in Fig. 4, the transverse support 12 includes rearwardly and downwardly extending bracket structure 25 provided with a transverse pivot pin 26 on which is pivoted a rearwardly extending swinging arm 27 constituting the main body member of the lock. The bracket structure 25 includes a generally C-shaped stop member having a pair of angularly spaced stop portions 28 that cooperate with a lug 29 on the swinging arm 27 for limiting swinging movement of the arm either upwardly or downwardly.

A rearward portion of the tube and cradle assembly includes a depending bracket 30 rigidly fixed on the cradle having set therein across its lower end a transverse, cylindrical pin 32 positioned to engage in respective aligned spaced apart saddle-like seats having semi-cylindrical recesses 31 formed on each side of the arm 27 at its rearward swinging end. When the parts are in traveling position as shown in Figs. 4 and 5, each end of the pin 32 fits the adjacent recess 31. Adjacent its rear end the swinging arm 27 is provided with transverse pivot means including a pair of depending ears 33, which serve by means of transverse pins 34, 34' to pivotally carry a lever or lock member 35. As best shown in Figs. 2 and 4, the member 35 extends forwardly and has an upwardly projecting tongue portion 36 provided with an opening 37. The portion 36 projects through a slot 38 in the under transverse portion of the swinging arm 27. When the parts are in traveling position, that is, with the swing-

ing arm 27 in its uppermost position, the opening 37 in the lock member 35 is adapted to receive the inner end of a plunger 39 slidably carried by a sleeve portion 40 that is integrally formed with or rigidly secured to the swinging arm 27. The plunger 39 is mounted in a bore 41 in the sleeve 40 and is normally spring pressed by a spring 42 into engagement with the portion 36 on the locking member 35 by means of the opening 37 therein. At its outward end the plunger 39 is reduced in diameter and is slidably carried in a bushing 43 which is threaded into the outer open end of the bore 41 in the sleeve 40 and which serves to abut the outer end of the compression spring 42. The plunger 39 is provided at its outer end with an operating handle 44 which includes a pair of laterally extending ears 45 through which is inserted a pivot pin 46. This pin serves to pivotally connect to the plunger 39 a first release link 47. This link is formed at its inner end with an L-shaped extension 48 co-operable with a depending flange 49 preferably formed integrally with the swinging arm 27. The link 47 is articulately connected by means of a pivot pin 50 to one end of a second release link 51, the other end of which is articulately connected by means of horizontal and vertical pivot pins 52 and 53 to bracket structure 54 rigidly secured to the left-hand trail 17.

The depending bracket 30 at the rear end of the cradle 24 includes a downwardly and rearwardly extending hook portion 55 adapted to receive a locking member 56 which is formed with an eye that cooperates with and receives there-through the hook 55. The locking member 56 is provided with a forwardly and downwardly extending shank adjustable in length and provided at its rear end with an eye 57 which is pivotally connected by means of a pin 57' to an intermediate portion of the first locking member 35. When the parts are in the positions shown in Fig. 4, the locking member 56 engages with the hook 55 and the plunger 39 engages through the opening 37 in the portion 36 of the locking member 35; the relationship between the axes of the pivots 34 and 57' is such that an over-center lock is provided and the cradle is thus rigidly locked to the transverse support 12 of the piece. A compression spring 58 is interposed between a recessed portion 59 of the swinging arm 27 and a depending arm 60 formed on the locking member 35. The function of this spring is to effect downward and rearward movement of the member 35 when the plunger 39 is disengaged from the opening 37 in the locking member portion 35, whereupon the pivot pin 57' also moves downwardly and rearwardly with the result that the member 56 becomes disengaged from the hook 55 on the bracket 30 on the cradle 24. Then, when the gun 23 is slightly depressed, that is, when its rear end is moved upwardly (the cradle 24 moving likewise), from the position of Figure 2, the swinging arm 27 and its associated parts may swing downwardly, thus freeing the recess 31 on the hanging arm 27 from the pin 32 and keeping clear of the latter on elevation of the piece. When the trails are closed and the travel lock secured by the plunger 39, the links 51 and 47 will have positions slightly to the right of the positions of the parts shown in broken lines in Fig. 2. The positions dotted illustrate how, after the trails have been closed, the plunger 39 may be pressed back by entry of the tongue 36 of the locking member when the latter is manually pressed upwardly to the position shown in full

lines. Thereafter, the plunger will snap to the right and engage in the opening 37. A torsion spring 61 functions between the links 47 and 51 at the pivot 50 thereof to urge the links yieldingly toward the folded position illustrated in broken lines.

In addition to the automatic release of the traveling lock upon spreading of the trails 17, the invention also provides means for releasing a protective shield to the position assumed during firing of the weapon. As best shown in Figs. 1 and 3, the transverse axle is provided with means in the form of brackets 62, only one of which is shown, providing a pivot 63 on a transverse axis for a swinging shield or apron 64. As shown in Fig. 3, the apron 64 extends forwardly in substantially a horizontal plane when the piece is in traveling position. When the weapon is positioned for firing, this apron assumes the position shown in broken lines in Fig. 3; that is, a position in which it affords protection to the weapon and particularly to the gun crew.

The axle 10 is provided at transversely spaced points thereon with a pair of forwardly extending bearing brackets 65 which journal a transverse rockshaft 66. This rockshaft has keyed thereto at opposite ends thereof depending hook members 67 which cooperate respectively with eyes 68 in the apron to lock the apron in traveling position and to release the apron for movement to firing position. Each hook 67 is tensioned by a spring 67a into engagement with its respective eye 68. The hook member 67 at the left side of the weapon is formed with an upwardly extending operating arm 69 which is connected to one end of an operating means in the form of a flexible element such as a cable 70. The cable 70 passes through a pulley 71 carried by an eye 72 on an upper portion of the axle 10 and extends rearwardly to a point at which it is rigidly secured by a clamping block 73 to the left-hand trail 17.

The apron 64 is provided with a second eye 74 to which is connected one end of an operating cable 75. This cable likewise extends rearwardly and is connected to the left-hand trail 17 by means of the clamp block 73. At its right-hand end the apron 64 is provided with an eye 76 similar to the eye 74. A cable 77 is connected at its one end to the eye 76 and passes around a first pulley 78 at the right side of the weapon and over a second pulley 79 at the left side of the weapon, whence it extends rearwardly and is connected to the left-hand trail 17 by means of the clamping block 73.

In the operation of the artillery weapon provided with the locking and release means constructed according to the present invention the gun crew is enabled to speed up maneuvering and emplacing of the piece; likewise the crew is enabled to cut to a minimum the time required to prepare the weapon for transport. When the trails 17 are in closed position and the weapon prepared for transport, the parts will be in the positions shown in broken lines in Figs. 1 and 2 and in full lines in Figs. 3 and 4; that is to say, the traveling lock will be in place, the trails will be together, and the apron 64 will be in its horizontal position. When the gun is disconnected from its prime mover and preparations are made to position it for firing, the trails 17 are spread. This action results first in a tightening of the cable 70 which in turn releases the hooks or latches 67 from the eyes 68 in the apron 64. The apron is thus permitted to swing downward-

ly to the position shown in broken lines in Fig. 3. Swinging movement of the apron downwardly is decelerated because of the connections afforded by the cables 75 and 77. As the left-hand trail is swung outwardly, the links 47 and 51 are extended and assume the positions shown in full lines in Fig. 2. The extension 49 on the inner link 47 engages the flange 49 on the swinging arm 27 of the traveling lock and the camming action thereof results in the withdrawal of the plunger 39 from the bore 37 in the vertical portion 36 of the locking member 35. This action frees the locking member 35 from its locked connection with the swinging arm 27 and the compression spring 58 urges the member 35 rearwardly, which in turn results in release of the locking member 56 from the hook 55 on the bracket 30 of the cradle 24.

When it is desired to transport the piece, the trails 17 are moved together. The torsion spring 61 at the joint 50 between the links 47 and 51 tends to move the members upwardly toward the position shown in broken lines in Fig. 2, thus permitting the plunger 39 to move inwardly on the swinging arm 27. At the same time a member of the gun crew moves arm 27 and also the locking members 35 and 56 into their previous positions, the cradle 24 having been lowered so that the pin 32 is in a position to enter the saddle recesses 31 on the swinging arm 27. While the members 35 and 56 are retained in this position the plunger 39 again engages the bore 37 in the projecting portion 36 on the locking member 35. In the event that the links 47 and 51 become damaged or are otherwise rendered inoperative, resort may be had to the operating handle 44 for actuation of the plunger 39. As the left-hand trail is moved inwardly, the cables 75 and 77 are tightened about its transverse pivot 63. Since the latches or hooks 67 are spring pressed, they are re-engaged with the eye 68 and the apron is locked in its horizontal position. The trails are connected at their rearward ends in the usual manner and the weapon is ready for transport.

It will be seen from the foregoing description that the objects of the invention hereinbefore enumerated are suitably achieved by the preferred construction illustrated. The attainment of these and other objects by other forms of the invention will be apparent to those skilled in the art. It will be understood, of course, that the preferred form of invention illustrated is subject to various modifications and alterations coming within the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a gun having a wheeled carriage and a pair of trails movable from a traveling position in which the trails are closed to a firing position in which the trails are spread apart, the combination of a protecting apron, means arranging said apron for movement from a first position facilitating travel of the carriage to a second position affording at least incidental protection to the carriage when the carriage is positioned for firing, a releasable lock operative to hold said apron in its first position, and means connected between said lock and at least one of said trails and operable in response to spreading of said trails to release said lock for movement of said apron to its second position.

2. In a gun having a wheeled carriage and a pair of trails movable from a traveling position in which the trails are closed to a firing position

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in which the trails are spread apart, the combination of a protecting apron, means arranging said apron for movement from a first position facilitating travel of the carriage to a second position affording at least incidental protection to the carriage when the carriage is positioned for firing, a releasable lock operative to hold said apron in its first position, means connected between said lock and at least one of said trails and operable in response to spreading of said trails to release said lock for movement of said apron to its second position, and means connected between said apron and at least one of said trails to return said apron to its aforesaid first position when said trails are closed to traveling position.

3. In a gun having a wheeled carriage, a pair of trails movable from a traveling position in which the trails are closed to a firing position in which the trails are spread apart, a gun tube movable on the carriage in elevation or depression, a releasable lock on the carriage connectable to the tube and operative to hold the tube against elevation or depression, the combination of means connected between said lock and at least one of said trails and operable in response to spreading of said trails to release said lock to free the tube for pointing movement on the carriage.

4. In a gun having a carriage, a ground-engaging element movable thereon from a travel position out of engagement with the ground to a battery position for engaging the ground when the carriage is emplaced, a gun tube movable on the carriage in elevation or depression, a first releasable lock operative to hold the tube against elevation or depression movable when released to a cleared battery position, an armor shield movable from a nonprotecting travel battery position to a protecting position, a second releasable lock operative to hold the shield in travel position, means connected between the first releasable lock and the ground-engaging element and operable in response to movement of the ground-engaging element to battery position to release said first lock and free the gun for elevation pointing on the carriage, and means connected between the second releasable lock and the ground-engaging element and operable in response to movement of the ground-engaging element to battery position to release the second lock for movement of the shield to protecting position.

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5. In a gun having a carriage and a ground-engaging element movable from a position out of engagement with the ground to a position engaging the ground when the carriage is positioned for firing, a protecting shield, means arranging said shield for movement from a nonprotecting position to a protecting position when the carriage is positioned for firing, a releasable lock operative to hold said shield in nonprotecting position, and means connected between said lock and said ground-engaging element and operable in response to movement of said ground-engaging element to ground-engaging position to release said lock for movement of said shield to protecting position.

6. In a gun having a carriage, a ground-engaging element movable thereon from a travel position out of engagement with the ground to a battery position for engaging the ground, a gun tube movable on the carriage in elevation or depression, the combination of a releasable lock operative to hold said tube against movement, and means connected between said lock and said ground-engaging element and operable in response to movement of said ground-engaging element to battery position to release said lock and free said gun tube for pointing movement.

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