

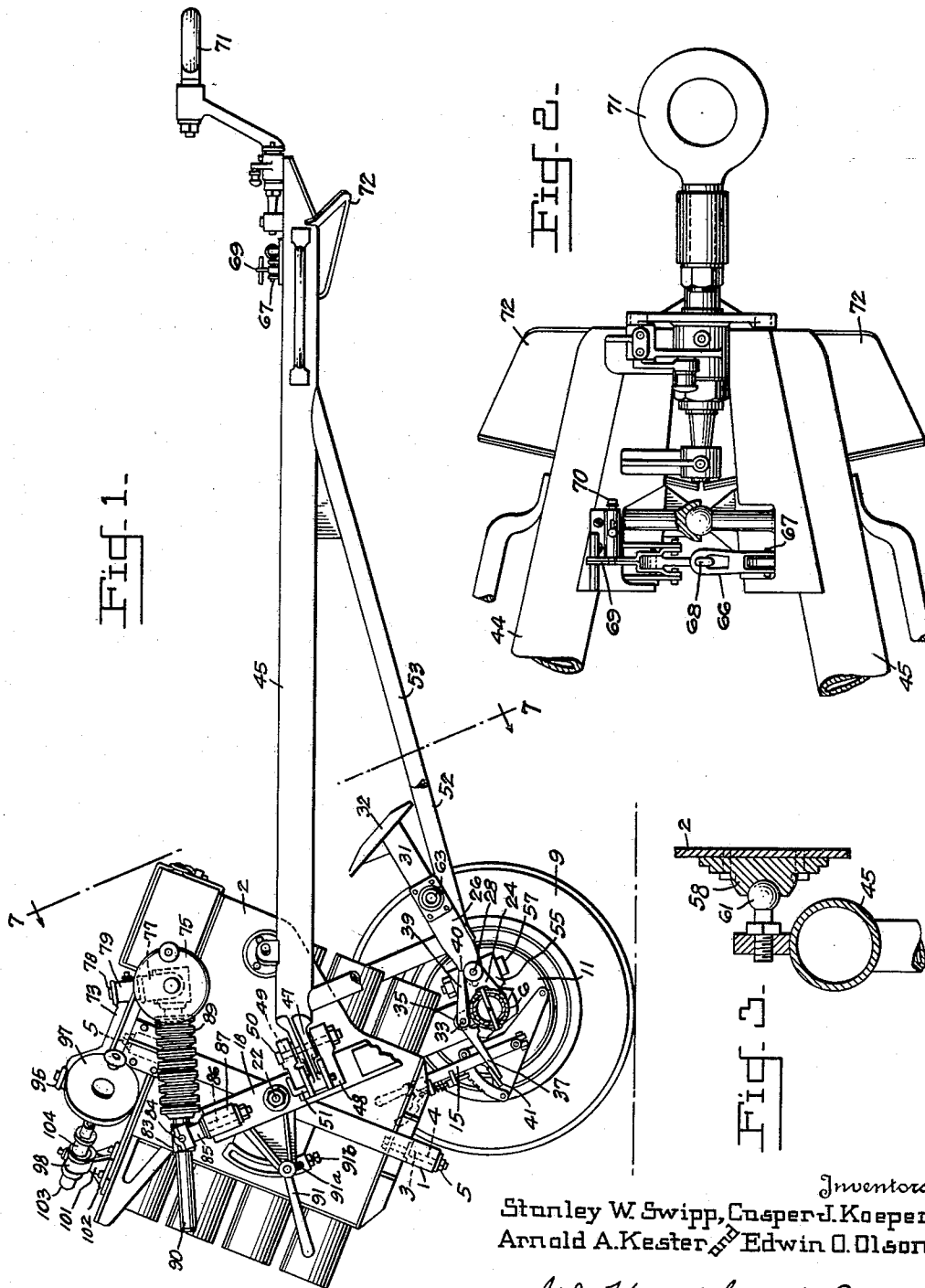
Oct. 18, 1955

S. W. SWIPP ET AL
MULTIPLE ROCKET LAUNCHER

2,720,818

Filed Dec. 11, 1951

3 Sheets-Sheet 1



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Fig. 5.

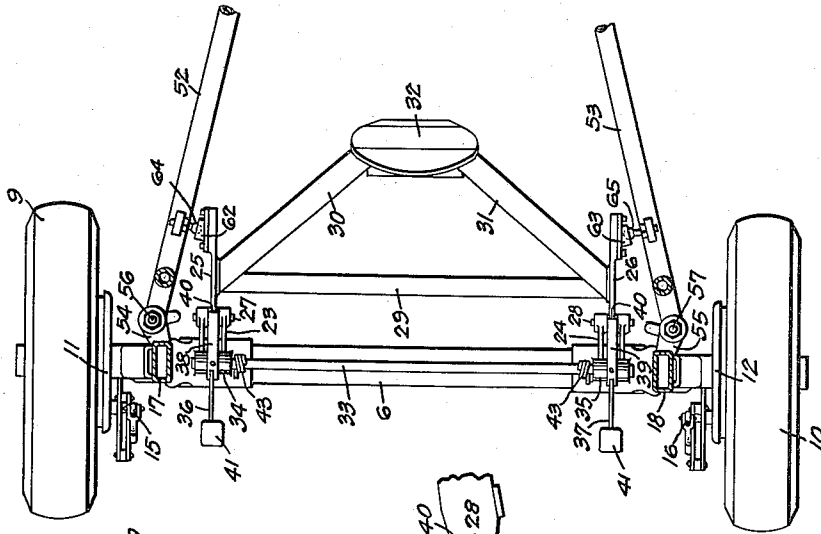


Fig. 11.

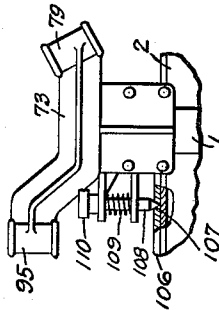


Fig. 6.

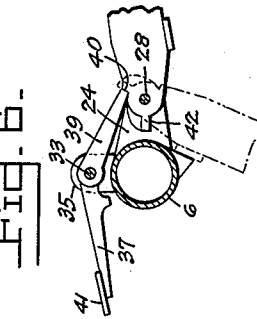
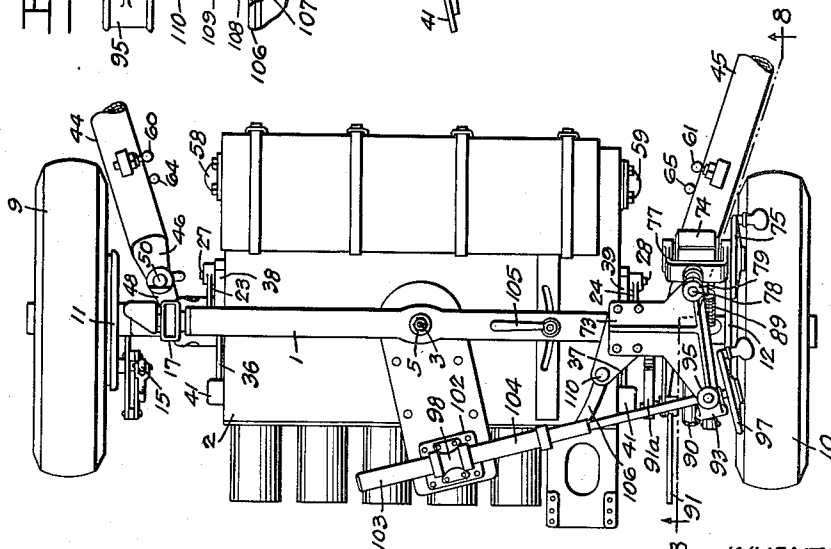


Fig. 4.



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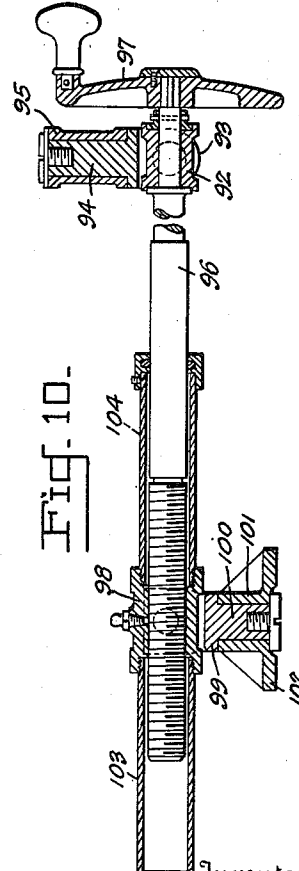
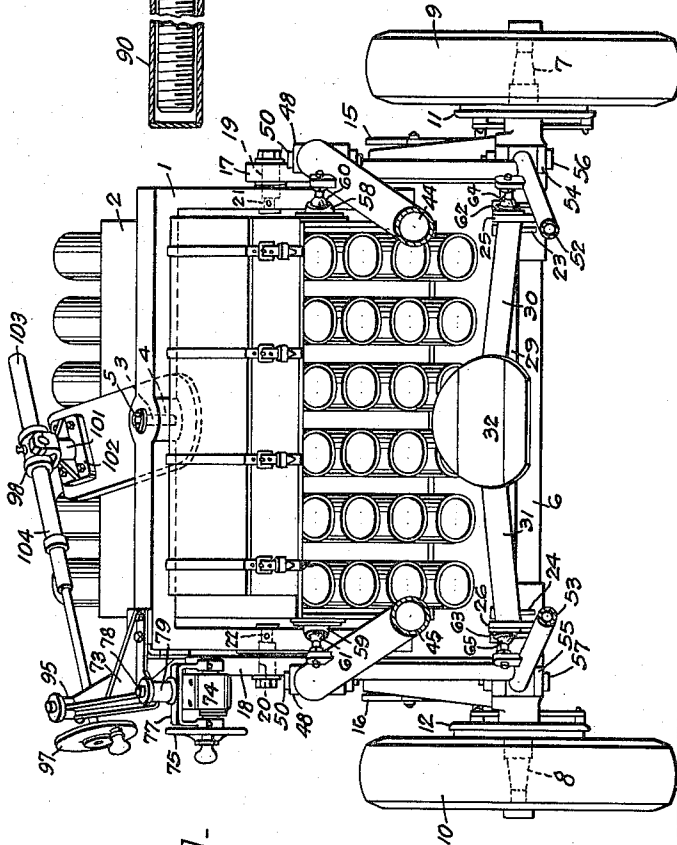
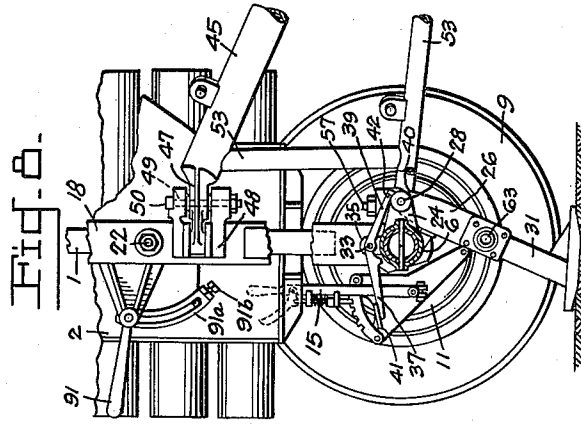
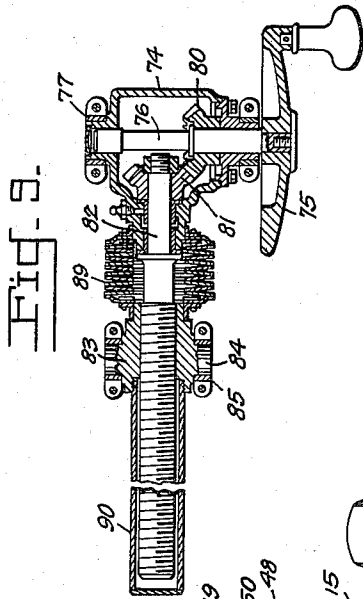


Fig. 7.

Fig. 10.

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MULTIPLE ROCKET LAUNCHER

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Application December 11, 1951, Serial No. 261,130

7 Claims. (Cl. 89—1.7)

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

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

The present invention relates to a multiple rocket launcher including a frame and cluster assembly of rocket tubes mounted on a two-wheeled, solid trail carriage equipped with pneumatic-tired wheels and designed to be towed by a prime mover at relatively high speeds.

The launcher mounts 24 tubes in four tiers of six in each tier, is loaded by inserting the rockets in the muzzle end of the tubes, and can be fired either singly or in ripples at intervals approximating one-half second between each round, the firing being by electrical contact. The carriage frame is rigidly connected to the axle supporting the wheel and to the cluster frame to provide a strong, stable easily towed unit, and in firing, the launcher is supported on a pedestal or, alternatively on firing segments, with the wheels clear of the ground. When traveling, the cluster is locked to the frame by means of appropriately positioned latching means, and the pedestal or segments are swung upwardly approximately 90° from firing position and secured in this position to provide ample clearance between the ground and the pedestal. Also provided are conveniently positioned hand actuable mechanisms to aim the cluster in azimuth and in elevation.

The entire launcher may be handled easily by two men to place it in firing position, and hand operated brakes are provided on each wheel so that the launcher may be controlled from a position behind either wheel.

It is accordingly an object of this invention, to provide a novel launcher in accordance with the above brief description.

A further object of this invention is the provision of means mounted on the carriage frame for aiming the cluster assembly in azimuth and in elevation.

A further additional object of this invention is the mounting of a pedestal on the axle of the carriage so that the carriage can be shifted from a first travel position to a second firing position.

Still another object of this invention is the provision of a ball and socket arrangement for locking the pedestal to the carriage frame in travel position plus additional pedal actuating latch means for locking the pedestal against displacement when the launcher is in firing position.

A still further object of this invention is the provision of means to lock the two members of the trail together in traveling position when a "split trail" instead of "wish-bone" type trail is used.

Other objects and advantages will become apparent during the course of the following description.

In the accompanying drawing, forming a part of the specification, and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a said elevation of the launcher in travel position.

Figure 2 is a plan view of the forward end of the "split

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trail" showing means to latch the trail members together in travel position.

Figure 3 is a detail showing the ball and socket joint for locking the trail and firing pedestal in travel position.

Figure 4 is a top plan view of the back end of the launcher with the pedestal lowered.

Figure 5 is a top plan view of the back end of the carriage with cluster removed.

Figure 6 is a detail of additional latching means for the pedestal. The solid lines show the pedestal in raised position and the dotted lines indicate the pedestal in firing position.

Figure 7 is a view on line 7—7 of Figure 1.

Figure 8 is a view on line 8—8 of Figure 4.

Figure 9 is a detail of the mechanism for aiming the rocket cluster in elevation.

Figure 10 is a detail of the traversing mechanism for aiming the rocket cluster in azimuth.

Figure 11 is a detail of a positioning plunger for locating the cluster frame in position to aline the ball and socket joints.

Referring to the drawings, the launcher of this invention comprises the rectangular cluster frame 1 of built up steel construction. A cluster box 2 comprising support members and spacer plates for the rocket tubes, is trunnioned within the cluster frame 1 so that the cluster box may be horizontally shiftable within certain prescribed limits, enabling the rocket tubes to be aimed in azimuth by the operator. This mounting comprises trunnion pins 3 secured to the top and bottom support plates of the cluster box in any convenient manner. Pins 3 extend through holes 4 in the top and bottom members of frame 1 and are threaded and fitted with nuts 5 in the well known manner. The cluster frame is mounted on the carriage of the launcher in a manner to be subsequently described.

The carriage assembly is of built up steel construction and comprises tubular steel axle 6 having solid steel wheel spindles 7 and 8 on each end for mounting the wheels 9 and 10. Mounted on the axle are backing plates 11 and 12 for wheel brakes (not shown). The brakes are of the commercial expanding brake band type and are mounted on the backing plate bolted to each end of the axle. Hand levers 15 and 16 are provided for individually controlling each wheel. The wheels are of the well known commercial disc and rim type bolted to the outer hubs, the hubs in turn being mounted on the wheel spindles on anti-friction bearings in the well known manner. Two upright members 17 and 18 are pressed and pinned in place about each end of the axle inwardly of the wheels, and each upright is machined with bearings 19 and 20 to receive trunnions 21 and 22 which are secured to the vertical members of the cluster frame in the well known manner. This mounting enables the cluster frame and box to be aimed in elevation in a manner to be later described. It is to be noted at this time that the cluster frame and box are so mounted in the carriage that they are shiftable in elevation as a unit, however in azimuth the cluster box is shiftable within the cluster frame, the cluster frame remaining in fixed position relative to the carriage.

Bifurcated brackets 23 and 24 are secured to the axle 6 inwardly of upright members 17 and 18. Flat bars 25 and 26 are received within the bifurcations and form the main support for the firing pedestal, the flat bars being rotatably secured to the brackets by pins 27 and 28. The pedestal per se comprises the beforementioned flat bars, a tubular member 29 horizontally disposed between the flat bars and fixed thereto, and two angularly disposed tubular members 30 and 31, forming with tubular member 29 an isosceles triangle. A platform 32 is secured in any convenient manner to the apex of the

triangle, and when the pedestal is rotated from its travel position about pins 27 and 28 (as seen in Figure 1) to its firing position, the entire launcher will rest on the pedestal platform with the wheels clear of the ground (see Figure 8).

Positive locking means are provided for maintaining the pedestal in firing position as clearly shown in Figures 5 and 6. This locking means comprises a rod 33 journaled in bearings 34 and 35 which form a part of brackets 23 and 24. Latch members 36 and 37 are pivotally supported about rod 33 and have extensions 38 and 39 which are received between the bifurcated ends of brackets 23 and 24. On one end the latch members bear against and engage flat bars 25 and 26 of the pedestal. These flat bars have a first notch 40 (see Figure 6) against which the ends of the latch members bear when the pedestal is in travel position. The latch members may be rotated counterclockwise by stepping on foot pedal 41. When the pedestal is placed in firing position the latch ends bear against a second notch 42 to positively lock the pedestal in firing position. Thus locking action is insured by the presence of the torsion spring 43 wound about and secured to rod 33 and also secured on either end to bracket bearing members 34 and 35. The spring is biased clockwise to bias the latch members clockwise against pressure exerted upon the foot pedal.

The launcher is also provided with a trail of tubular steel construction. The trail disclosed is of the split trail type with means to lock the left and right trail members together when the launcher is being towed, however it is to be understood that any other well known type trail such as the "wishbone" type may be used. The split trail comprises upper right trail member 44 and upper left trail member 45, having reduced portions 46 and 47. Referring to Figure 1, reduced portion 47 of left trail 45 is received between the bifurcations of bracket 48 fixed in any convenient manner to upright 18. The trail and bracket are provided with bores 49 to receive a pintle 50 which acts as a pivot for trail 45 so that it can be moved to firing position or in position to be locked for traveling. The bracket and reduced trail end are additionally bored to receive a trail locking pin 51 for locking the trail when in travel position. A similar mounting is also provided for right trail 44 on the upright member on the right side of the launcher. Additional strengthening members 52 and 53 are also provided for the right and left trails. These members lie below and are angularly disposed with respect to the main trail members and are welded thereto on one end, the other end being received by brackets 54 and 55 secured to the carriage axle in any convenient manner. These lower members are also provided with pintles 56 and 57 so that each trail member may be moved as a unit. Means are also provided to secure the cluster frame and box and the pedestal to the trails in travel position. These means comprise ball and socket connections, sockets 58 and 59 being mounted on the side supports of the cluster box to receive ball members 60 and 61 secured in any convenient manner to the trails. Similar sockets 62 and 63 are provided on flat bars 25 and 26 of the firing pedestal to receive balls 64 and 65 mounted on the lower trail supporting members. Details of this ball and socket connection are clearly shown in Figure 3.

When in travel position the trails are locked together in the following manner by a toggle joint type trail lock comprising a loop 66 swingable about a pin 67 mounted on the left trail and engaging an adjustable hook or eye 68 mounted on the right trail. The lock is operated by handle 69 which in turn is secured by spring loaded sliding bolt latch 70. To release the lock, the latch is withdrawn, and the handle is lifted to disengage the hook from the eye. A lunette 71 is secured to one of the trail members so that the launcher may be towed by

a prime mover. Also provided are spades 72 on each trail member to insure sturdy ground support for the emplacing members when in firing position.

A bracket 73 is bolted or welded to the top horizontal member of the cluster frame and extends outwardly therefrom to mount the elevating and traversing mechanisms. The elevating mechanism (see Figures 1, 4, 7, and 9) comprises a housing and cover assembly 74 mounting a handwheel 75 which is rotatable about a shaft 76 extending through the housing and cover assembly trunnioned on a yoke 77 provided with a bearing 78 which is machined to rotate in a mating bearing 79 in the cluster frame bracket 73. A first bevel gear 80 secured about shaft 76 and rotatable therewith meshes with a second bevel gear 81 which is secured about a screw 82 disposed at right angles to shaft 76. Elevating screw nut 83 is mounted and pivots on trunnions 84 in a yoke 85 provided with a bearing 86 which is machined to rotate in a mating bearing 87 in a bracket 88 mounted on the axle upright. Movement of the handwheel is transmitted to the screw by way of the gear train. This causes the screw to rotate thereby moving the nut relative to the screw to shorten or lengthen the distance between the nut and the yoke thereby causing the cluster frame to pivot on its trunnions to elevate or depress the rocket tubes. A dust cover 89 and tube 90 are provided to keep out the dirt and dust. Suitable fittings are also provided to lubricate the gear train and other parts. An elevating clamp handle 91 located on the left side of the carriage (see Figure 1) is used to lock the rocket tubes in any position of elevation within the range provided.

The traversing mechanism, also mounted on bracket 73 and of the screw and nut type similar to the elevating mechanism, comprises a housing 92 trunnioned on yoke 93 which is provided with a bearing 94 machined to pivot within a mating bearing 95 on the bracket 73. A screw 96 extending through a bore in housing 92 and at right angles to the trunnions of yoke 93 is rotatable by a handwheel 97. A traversing nut 98 is mounted and pivots on trunnions in yoke and cap assembly 99 which is provided with a bearing 100 received within a mating bearing 101 in a support bracket 102 bolted to the top of the cluster box. When the handwheel is rotated the nut 98 is moved relative to the traversing screw 96, thereby lengthening or shortening the distances between the nut 98 and yoke 93 mounted on bracket 73 to move the cluster box in azimuth. Tubes 103 and 104 protect the screw and nut from dirt and dust, and appropriate fittings are provided for lubricating purposes. A traversing clamp handle 105 is provided to lock the cluster box in any position of traverse within the range provided.

Means are also provided for locating the cluster frame and box in proper position for alinement of the ball and socket seats on the frame and trail. Referring to Figures 11 and 4, these means comprise a wear plate 106 on the top plate of cluster box 2 having a detent or hole 107 which is engaged by a plunger 108 secured to brackets fixed to bracket 73 and biased downwardly by a spring 109 into hole 107. The plunger has a cap or head 110 which may be grasped by the fingers of an operator when it is desired to release the plunger from the detent. The hole is located in a position such that when the cluster box is moved in azimuth, the plunger will travel upon wear plate 106 until plunger 108 is forced into hole 107. At this point the box is in proper position in azimuth for aligning the ball and socket joint for locking the frame and trails. Elevating clamp mechanism 91a (Figure 1) includes a screw 91b which may be adjusted to limit the movement in elevation of the cluster frame 1 so that the sockets in the cluster frame and box are in proper position in elevation to receive the trail and pedestal ball detent means in order to lock the trail in travel position so that the launcher may be towed.

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It can readily be seen that the launcher may be shifted from its firing position to travel position with rapidity and ease, the before-mentioned aligning means enabling an operator (or operators) to place the cluster frame and box in proper position in an emergency for a quick march without needless waste of time and manpower which can ill be spared.

The launcher also is provided (not shown) with a telescope for sighting the target and a firing mechanism comprising a generator which generates current through a selective switch on the rocket firing mechanism located in a control box mounted on top of the rocket cluster. The tubes are fired by a lanyard attached to a firing lever on the firing mechanism, and a separate pull is required to fire each individual rocket tube. As the firing mechanism forms no part of the present invention it will not be further described.

Numerous modifications and alterations of the structure which has been disclosed herein for purposes of illustration will be apparent to one skilled in the art and it is obvious that the same may be made without departing from the spirit and scope of the invention as defined in the following claims.

We claim as our invention:

1. A multiple rocket launcher adapted to be towed by a prime mover comprising, an emplacing member, means mounted on one end of said emplacing member for applying a tow line thereto, axle means mounted on the opposite end of said emplacing member, a wheel mounted on each end of said axle, a rectangular frame mounted on said axle and trunnioned for pivoting about a horizontal axis with respect to said axle, a cluster box having a plurality of rocket tubes, trunnioned in said rectangular frame for pivoting about a vertical axis, first means mounted on said rectangular frame for elevating said frame and said cluster box as a unit, second means mounted on said frame for traversing said cluster box relative to said frame, a pedestal pivotally mounted on said axle and shiftable from a first stowed position to a second firing position, socket means mounted on said pedestal to receive a ball fixed to said emplacing member to lock said pedestal in first stowed position, and latch means mounted on said axle to lock said pedestal in second firing position whereby said wheels are free of the ground.

2. A multiple rocket launcher adapted to be towed by a prime mover comprising, a right trail member and left trail member horizontally angularly disposed relative to one another to form a V, each said trail member having a first upper member and a second lower supporting member fixed to said upper member and forming a vertical angle therewith, means for locking said right trail member to said left trail member, a horizontal member fixed to the free ends of said supporting members to form an axle, a tired wheel mounted on each end of said axle, an upright member secured to each end of said axle inwardly of said wheels, bracket means for pivotally securing said upper trail members to said upright members, a rectangular cluster frame pivotally mounted on said upright member for movement about a horizontal axis, a cluster box having a plurality of rocket tubes, secured to said frame to pivot as a unit therewith about said horizontal axis, said cluster box being pivotally mounted in said frame for movement about a vertical axis, means mounted on said frame to aim said frame and cluster box in elevation, additional means mounted on said frame to aim said cluster box in azimuth, a firing pedestal pivotally mounted on said axle and shiftable from a first stowed position to

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a second firing position, socket means on said pedestal cooperating with ball detent means mounted on said trail to lock said pedestal in stowed position, latch means resiliently pivotally mounted on a rod parallel to and secured to the upper surface of said axle and cooperating with said pedestal to lock it in firing position, and a lunette fixed to the apex of the V of said trail members whereby said launcher may be towed.

3. The combination in claim 2 wherein said means to elevate said frame and cluster box comprises a bracket bolted to the upper horizontal member of said cluster frame, a first yoke having a bearing received in a mating bearing formed in said bracket, a shaft journaled in said yoke, said shaft having a handwheel fixed to one end whereby said shaft may be rotated, a first bevel gear secured about said shaft to rotate therewith, a bracket secured to one of said uprights, a second yoke having a bearing received in a mating bearing formed in said upright bracket, an elevating screw nut trunnioned on said second yoke, a screw received in said screw nut and having a second bevel gear mounted on one end to mesh with said first bevel gear whereby rotation of said handwheel causes said cluster frame and box to move in elevation.

4. The combination in claim 2 wherein the means to traverse the cluster box within said frame comprises a bracket bolted to the upper horizontal member of said frame, a first yoke having a bearing received in a mating bearing formed in said bracket, a housing trunnioned on said first yoke, a support bracket secured to the top of said cluster box, a second yoke having a bearing received in a mating bearing in said support bracket, a traversing nut trunnioned in said second yoke, a traversing screw supported in said first yoke and received by said traversing nut, and a handwheel secured to one end of said screw whereby rotation of said handwheel causes said cluster box to move in azimuth.

5. The combination set forth in claim 2 wherein said means for locking said trail members together comprises a hook pivotally supported upon one of said trail members, a handle for actuating said hook, an eye pivotally mounted on said other trail member for receiving said hook, said hook having a toggle joint whereby manipulation of said handle causes said hook to slide in said eye so that said eye may be swung upwardly about its pivot to release said hook to unlock said trail members.

6. The combination set forth in claim 2 including means mounted on said cluster box for firing said rocket tubes.

7. The combination set forth in claim 2 including first clamp handle means mounted on said cluster box to lock said box in any position of elevation, and second clamp handle means mounted on said cluster box for locking said box in any position at azimuth.

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