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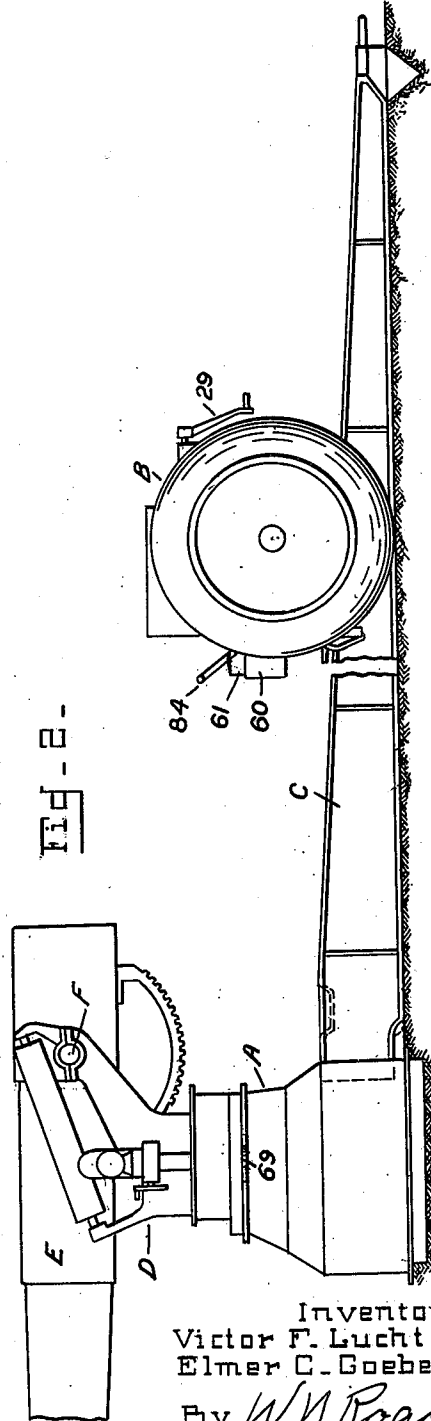
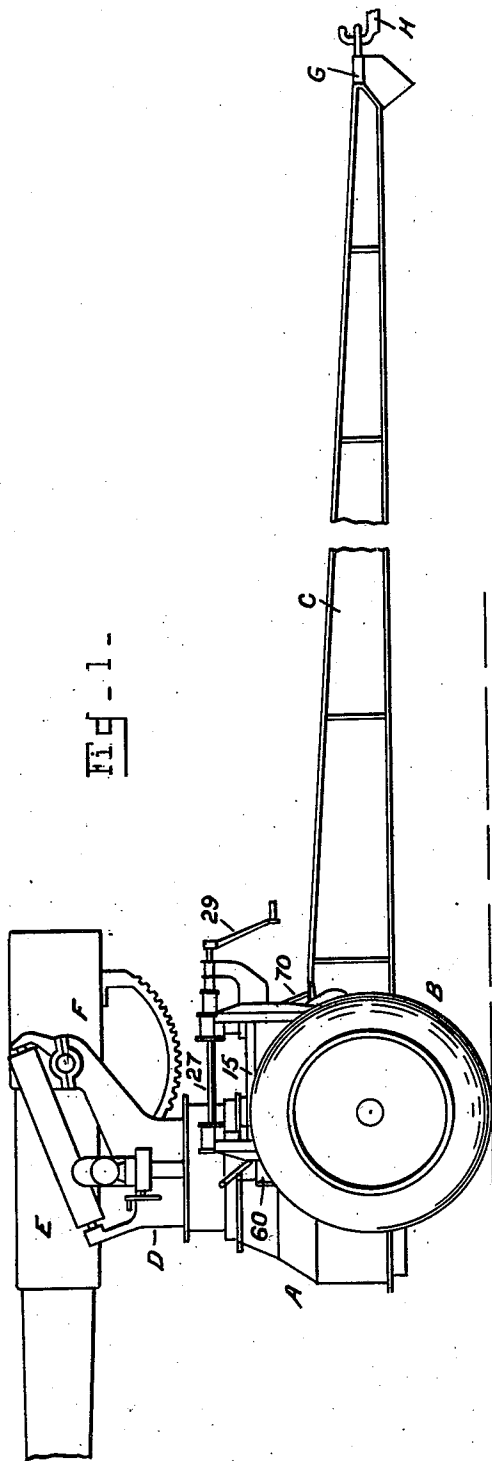
V. F. LUCHT ET AL

2,116,526

GUN CARRIAGE

Filed March 20, 1936

5 Sheets-Sheet 1



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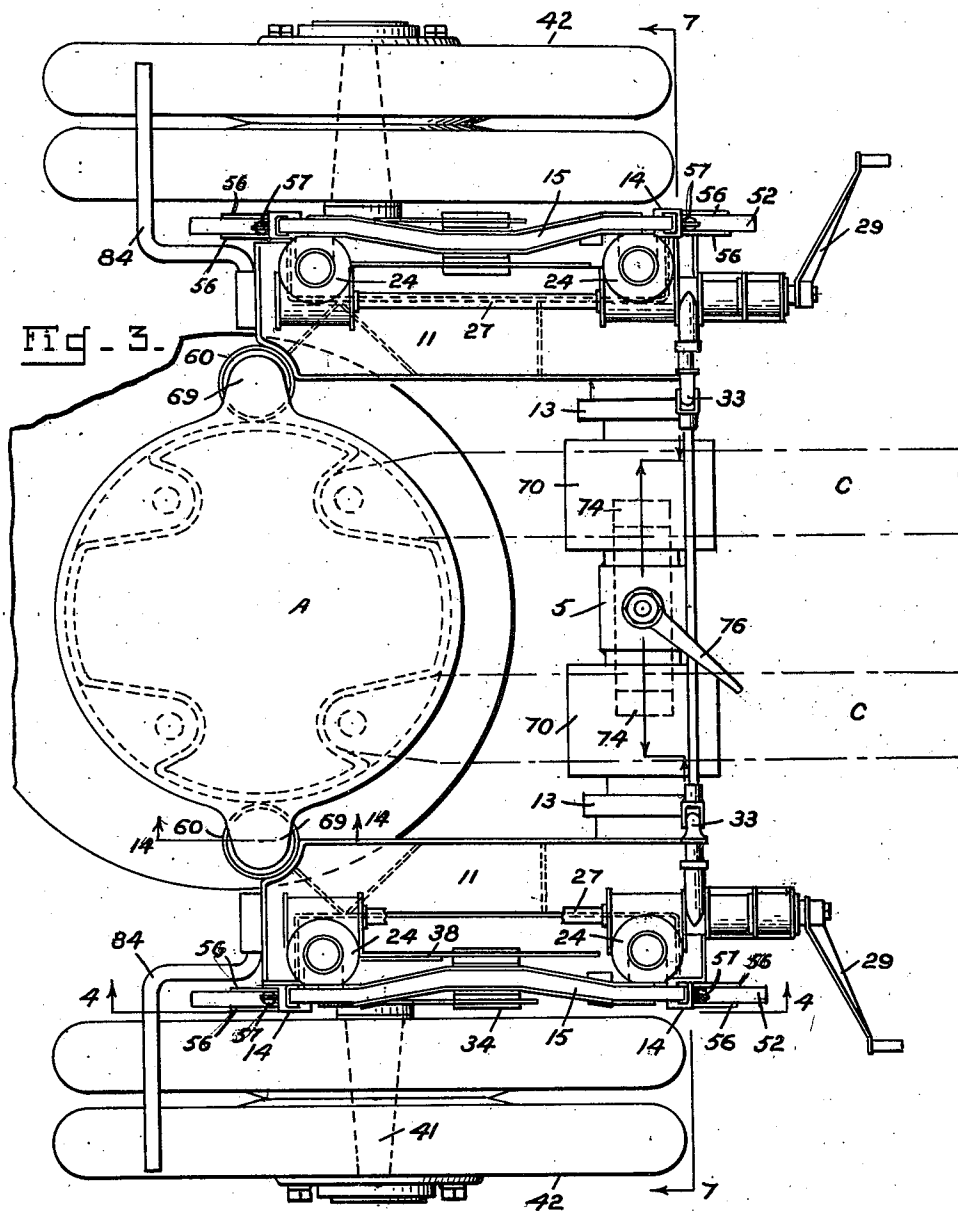


Fig - 3.

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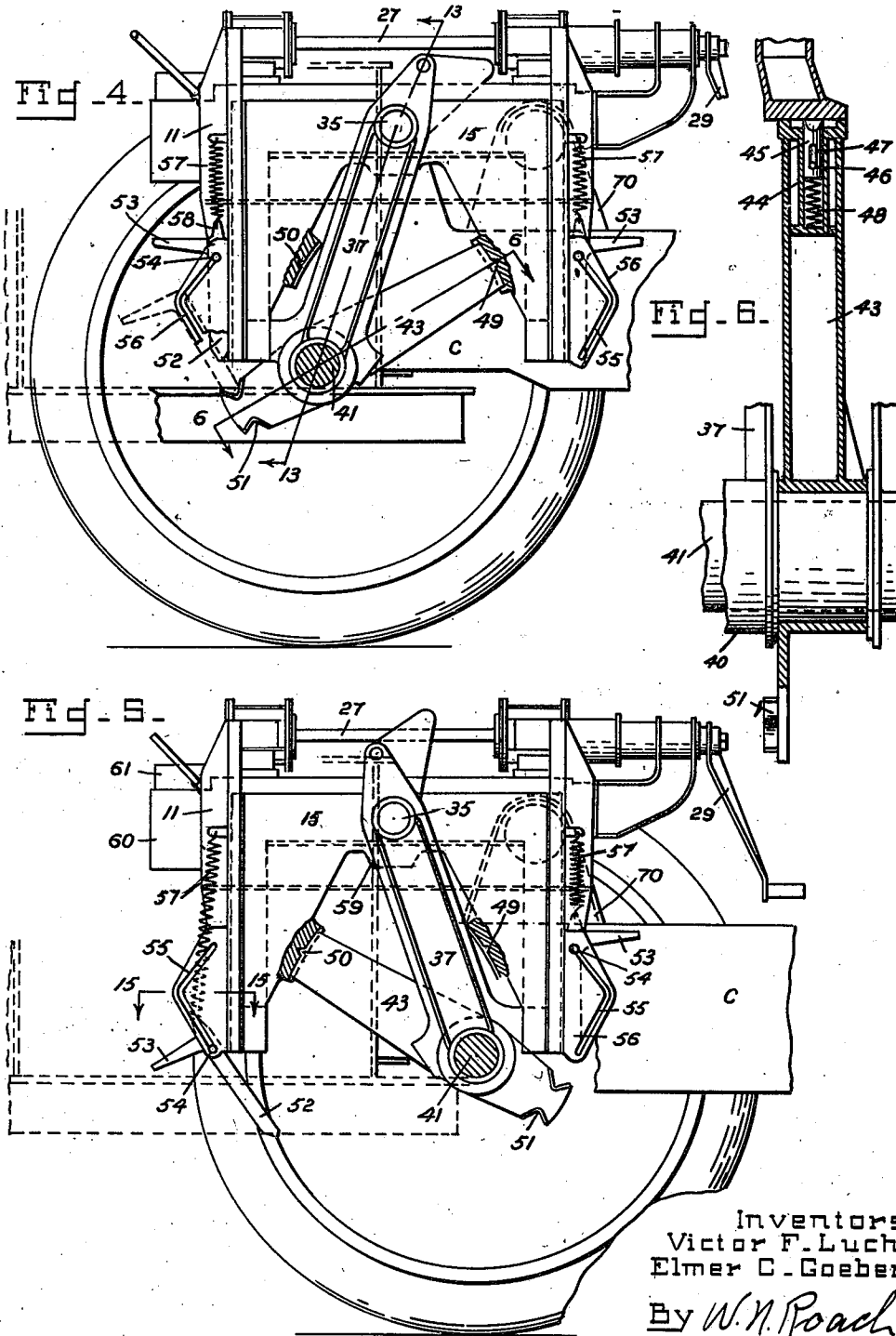
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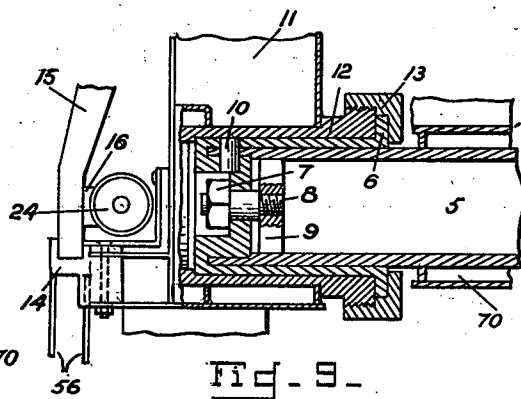
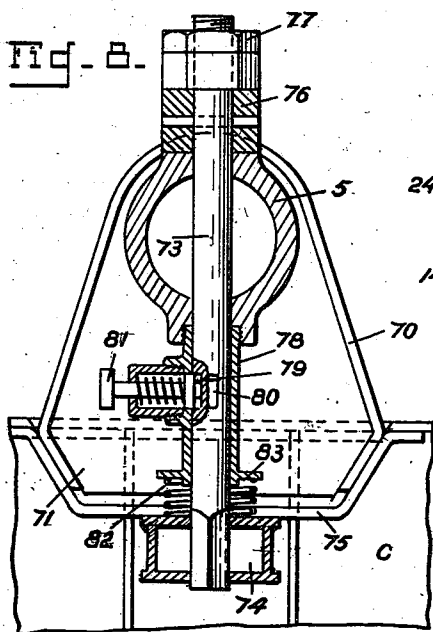
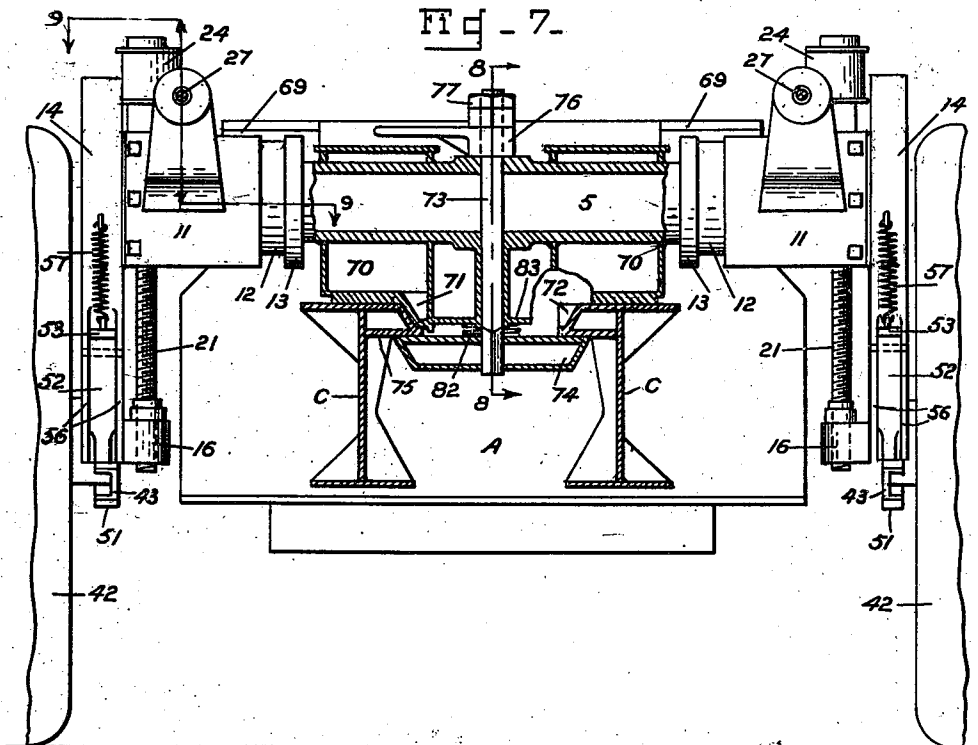
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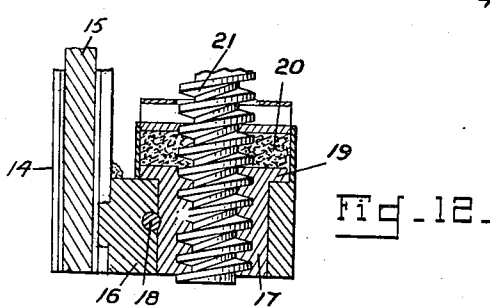
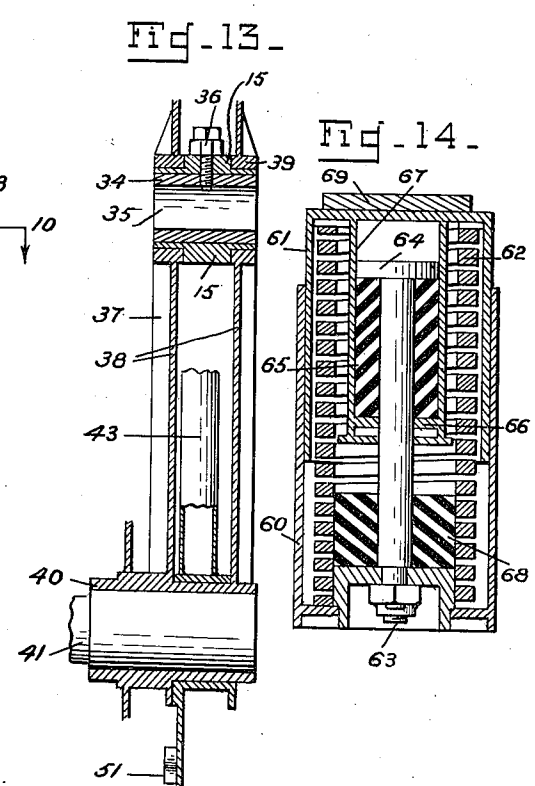
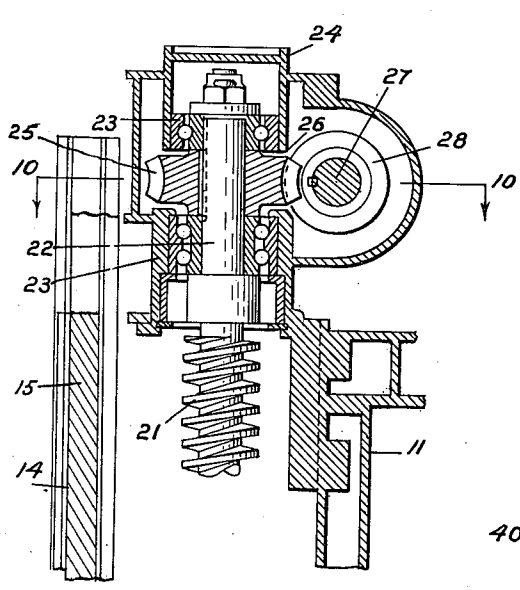
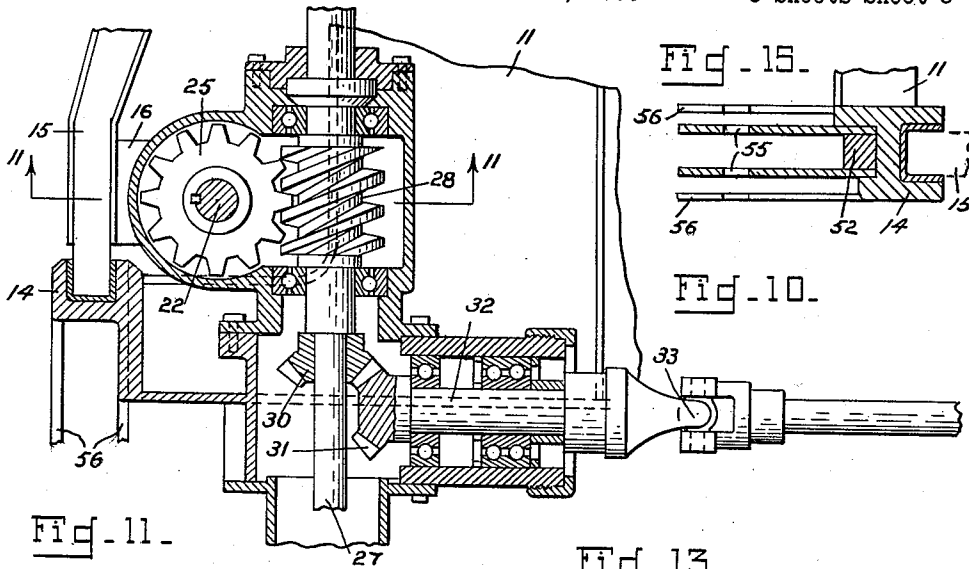
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GUN CARRIAGE

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UNITED STATES PATENT OFFICE

2,116,526

GUN CARRIAGE

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8 Claims. (Cl. 89—40)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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

This invention relates to a gun carriage and more particularly it has reference to the mobile unit for supporting and transporting a gun mount.

In anti-aircraft artillery having the mobility characteristic of light field artillery, it is customary as shown in Patent No. 1,951,338 of March 20, 1934, to provide a wheeled axle unit which detachably carries the gun mount so that the latter may be directly emplaced on the ground.

The purpose of this invention is to provide an arrangement whereby the wheels may be shifted with respect to the load member so that the lunette load may be changed from a light load for limbering to a heavy load for traveling.

Further objects are to provide an arrangement whereby the axle may be raised and lowered with respect to the wheels so that the gun mount may be emplaced on the ground and to include in this arrangement a resilient and yielding support for the gun mount to eliminate road shocks.

To these and other ends, the invention consists in the construction, arrangement and combination of elements described hereinafter and pointed out in the claims forming a part of this specification.

A practical embodiment of the invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a view in side elevation of the improved gun carriage in traveling position.

Fig. 2 is a similar view showing the gun mount lowered onto the ground and the wheel unit disconnected therefrom.

Fig. 3 is a plan view.

Fig. 4 is a view on the line 4—4 of Fig. 3 showing the traveling position of adjustment of the wheel arm.

Fig. 5 is a similar view showing the unlimbering position of adjustment of the wheel arm.

Fig. 6 is a sectional view on the line 6—6 of Fig. 4.

Fig. 7 is a view on the line 7—7 of Fig. 3.

Fig. 8 is a sectional view on the line 8—8 of Fig. 7.

Fig. 9 is a view taken generally on the line 9—9 of Fig. 7.

Fig. 10 is a sectional view on the line 10—10 of Fig. 11.

Figs. 11 and 12 are sectional views on the line 11—11 of Fig. 10.

Fig. 13 is a sectional view on the line 13—13 of Fig. 4.

Fig. 14 is a sectional view on the line 14—14 of Fig. 3.

Fig. 15 is a sectional view on the line 15—15 of Fig. 5.

Referring to the drawings by characters of reference:

There is shown a gun carriage consisting generally of a pedestal mount A supported by a detachable wheel unit B and by split trail members C, and supporting a top carriage D of typical anti-aircraft design in which a gun E is trunnioned as at F adjacent the breech to provide for high angle firing.

The wheel unit B comprises a connecting shaft or axle 5 having on each end a bushing 6 (Fig. 9) which is restrained by a nut 7 on a bolt 8 fixed in an end plate 9 and which is held against rotation by a pin 10. A pair of parallel, vertically disposed side frames 11—11 are mounted on the opposite ends of the axle 5 and each frame has a bearing 12 adjacent one corner for receiving a bushed end of the axle. The assembly is maintained by means of a retaining ring 13 threaded on the inner end of the bearing and engaging the inner end of the bushing 6.

Each side frame 11 (Figs. 3 and 9) is formed on its outer side with a pair of guides in the form of channel members 14—14, arranged vertically and adapted to receive the sides of a yoke plate 15. Each leg of the yoke has an apertured foot 16 (Fig. 12) in which a nut 17 is fixed by means of a pin 18. A flange 19 on the nut seats on the upper face of the foot and carries a grease cup 20.

A pair of screw shafts 21 disposed opposite to the legs of the yoke plate each threadedly engages a corresponding nut and has a spindle 22 (Fig. 11) at its upper end whereby it is mounted through anti-friction bearings 23—23 in a casing 24 that is part of the side frame 11. A worm wheel 25 splined on the spindle 22 extends through an opening 26 in the casing.

Each side frame carries a shaft 27 having a pair of worms 28—28 which are in mesh with the worm wheels 25—25 of the two spindles associated with each yoke plate. The shaft 27 is rotated by means of a crank handle 29. Each of the shafts 27 of the two side frames 11 carries a bevel gear 30 (Figs. 3 and 10) which meshes with a bevel gear 31 on the corresponding end of a connecting shaft 32 including universal couplings 33—33. By means of this arrangement the two frames are moved simultaneously upon actuation of either one of the shafts 27.

The upper part of the yoke plate 15 is formed centrally with a bearing 34 (Fig. 13) which carries a pin 35 that is held in place by a screw 36. An arm 37 consists of spaced plates 38—38 straddling the yoke plate 15, and each plate has a bearing 39 whereby it is mounted on an end of the pin 35. The lower end of the arm carries a bearing 40 for receiving a spindle 41 on which twin wheels 42—42 are mounted for independent rotation.

The arm 37 includes a locking link 43 rotatably mounted on the bearing 40 between the arms 38—38 and carrying at its outer end a casing 44 (Fig. 6) in which a latch 45 is mounted for sliding movement within the limits determined by a split pin 46 which passes through the casing and through a slot 47 in the latch. A spring 48 may be provided to normally hold the latch in extruded position. The latch 45 is adapted to selectively engage a pair of slots 49 and 50 (Figs. 4 and 5) provided respectively on the inner sides of the front and rear legs of the yoke plate 15, and serves to hold the arm 37 against the appropriate leg of the yoke plate.

The locking link 43 extends a short distance below the bearing 40 and has opposite grooves 51—51 at its lower extremity. The link is released from engagement with the yoke plate by means of similar actuators carried on opposite sides of the channel members 14 of the side frames 11 and arranged to engage the grooves 51—51. Each actuator consists of an angled bar having one arm 52 normally disposed vertically against the channel member 14 with its lower end at the lower end of the yoke plate and having another arm 53 extending horizontally and adapted to be stepped on by the foot of an operator. A pin 54 in the heel of the actuator rides in an angled blind slot 55 provided in a set of plates 56 fixed to the channel member 14. A spring 57 connected to the yoke plate and to an ear 58 mounted on the pin 54 normally maintains the actuator in the raised position with the pin 54 at the upper end of the slot 55. When the actuator is forced downwardly it is constrained to an inclined position by virtue of the pin and slot connection and engaging in one of the grooves 51 causes rotation of the locking link 43 until the latch 45 engages behind a block 59. Further movement of the locking link 43 will be described later.

The pedestal mount A and the trails C are connected to the side frames 11—11 and the shaft 5 of the wheel unit B. Each side frame carries a resilient suspension unit (Figs. 3 and 14) consisting of a lower cylinder 60 fixed to the side frame and an upper movable cylinder 61 slidably fitted within the fixed cylinder. A helical spring 62 normally tends to raise the movable cylinder but its action is limited by means of a rod 63 fixed to the bottom of the fixed cylinder 60 and having a head 64 which acts through a rubber block 65 on a disc 66 forming part of the movable cylinder. In order to obtain a compact structure the disc 66 is at the lower end of a tube 67 which depends within the spring 62 from the top of the movable cylinder and houses the rubber block 65 and the upper portion of the rod 63. A rubber block 68 supported by the bottom of the fixed cylinder and embracing the rod 63 is arranged to be engaged by the tube 67 and to yieldingly cushion the downward stroke of the movable cylinder.

The pedestal mount is provided on its opposite sides with laterally extending arms 69—69 adapted to rest on the movable cylinders of the

suspension units of the two side frames 11—11.

The connecting shaft or axle 5 of the wheel unit is provided with a pair of similar depending members 70—70 (Figs. 7 and 8) adapted to engage the upper sides of the trails C when the trails are closed or brought together for traveling. Each member 70 has a lug 71 on its inner side adapted to enter a three-sided socket 72 formed in the inner side of the corresponding trail.

A bolt 73 mounted vertically in the center of the axle 5 has a latch 74 fixed to its lower end. When the latch is positioned parallel to the axle 5 its ends are disposed underneath plates 75—75 on the trails C which are thereby clamped to the axle of the wheel unit. When the shaft is turned through ninety degrees the latch is disengaged from the trails and disposed parallel thereto. The bolt is rotated by means of a handle 76 keyed to its upper end and retained against the axle 5 by a nut 77.

The bolt 73 passes through a housing 78 on the under side of the axle 5 and is formed with a pair of recesses 79 and 80 adapted to selectively receive the inner end of a spring-pressed plunger 81 carried by the housing 78 and serving to hold the bolt and its latch in locking and unlocking positions. A spring 82 confined between the latch 74 and a plate 83 connecting the lower end of the housing 78 and the two depending members 70—70, maintains the bolt in lowermost position so that the recesses 79 and 80 will be in the plane of the plunger 81 and the latch 74 will be in the proper relation with respect to the plates 75—75 of the trails.

The side frames 11—11 of the wheel unit are each provided with a handle-bar 84 (Fig. 3) whereby the wheel unit may be conveniently moved.

The wheels of the unit B are each provided with a more or less conventional system of brakes, which, for the sake of clarity, are not shown in the drawings.

In the traveling position the pedestal mount A is supported by the two suspension units 60—61 on the side frames 11—11 of the wheel unit B and the two trail members C—C of the mount A are locked to the axle 5 of the wheel unit. The arms 37 carrying the wheels are inclined forwardly with respect to the lunette G of the trails which is coupled to a towing vehicle generally indicated at H. In this position of adjustment of the arms 37 the center of gravity of the gun mount A is located to place a heavy load on the lunette. This arrangement has been found to produce the best results from the standpoint of traction of the towing vehicle.

When the wheels of the unit B pass over an irregularity the side frames 11 rotate independently of each other about the axle 5 and compress the spring 62 of the suspension units. By virtue of this arrangement the gun mount A is resiliently supported and will ride on a more or less even keel.

The operation of lowering the pedestal mount A to the ground involves the step of unlimbering the lunette G from the towing vehicle so that the trails C may be either held or gently lowered to the ground. In order that it will be possible for a few men to perform this task the load of the mount A must first be shifted rearwardly. This is accomplished by stepping on the rear actuators 52—52 to swing the locking links 43 to positions of alignment with the arms 37 with their latches 45 engaged behind the blocks 59. The brakes of the wheels are then applied to hold the

wheels in place and the towing vehicle is moved a slight distance rearwardly to displace the trails C and pedestal mount A relative to the wheels 42. During this operation the arms 37 swing about their pins 35 until their lower ends are stopped by the front leg of the yoke plate (Fig. 5). With the arms 37 in this position, the locking links 43 will rotate about the bearings 40, due to gravity, until their latches 45 engage in the slots 50 in the rear legs of the yoke plates. The load is now shifted rearwardly of the wheel spindle and a few men will be capable of uncoupling the trails C from the towing vehicle.

The crank handle 29 is now actuated so that the worms 28 on the shaft 27 will rotate the screw shafts 21 which move through the nuts 17. Since the screw shafts are carried by the side frames these frames and the axle 5 will consequently be lowered until the mount A and the trails C rest on the ground.

The wheel unit B may now be disengaged from the trails C by turning the handle 76 to move the latch 74 out of engagement with the trails C. By pushing down on the handlebars 84 the wheel unit is tilted about the point of ground contact of the wheels so that the cylinders 61 of the suspension units will be lowered and thereby moved away from the arms 69 of the mount A since they are not attached to said arms and the depending members 70 on the axle 5 will be elevated and thereby moved out of contact with the trails. The wheel unit may now be rolled clear of the trails as suggested in Fig. 2 so that the trails may be opened out as understood in the art. Emplacement of the mount A is completed by attaching outriggers (not shown) which are counterparts of the trail C.

The operations involved in lowering the mount A and removing the wheel unit B are reversed when the mount is to be prepared for traveling. Should a condition arise wherein the vertical center line of the mount A is inclined with respect to the ground so that the lugs on the depending members will not seat in the sockets of the trails, it will first be necessary to actuate the handle 29 in the direction for lowering. Since the side frames are engaged with the mount resting on the ground this operation will cause the wheels and the yoke plate to be raised off of the ground and thereby enable the lugs 71 to be seated in the sockets 72 of the trails C.

We claim:

1. In a gun carriage, a mobile unit including an axle, parallel side frames rotatably mounted on the ends of the axle, a yoke plate slidably engaging each side frame, a pair of screw jacks carried by each side frame and engaging the yoke plate, an arm pivotally mounted on each yoke plate, a wheel on each arm, a link on the lower end of each arm and having positions of engagement with the yoke plate to the front and rear of the arm, a yielding suspension unit carried by each side frame whereby a gun mount may be supported on the suspension units and removably attached to the axle.

2. A mobile unit including an axle, parallel side frames rotatably mounted on the ends of the axle and vertically displaceable therewith, a yoke

plate slidably carrying each side frame, a pair of screw jacks carried by each side frame and engaging the yoke plate, an arm pivotally mounted on each yoke plate, a wheel on each arm, a link on the lower end of each arm and having positions of engagement with the yoke plate to the front and rear of the arm, and a yielding suspension unit carried by each side frame, whereby a load member may be supported on the suspension units and removably attached to the axle.

3. A mobile unit including an axle, parallel side frames rotatably mounted on the axle, a wheel associated with each side frame, a yielding suspension unit carried by each side frame remote from the axle, and a load member resting on the suspension units and having members passing under and removably attached to the axle.

4. A mobile unit including an axle, parallel plates carried by the axle, an arm pivotally mounted on each plate, a wheel on the lower end of each arm, a link pivotally mounted on the lower end of each arm for independent movement in a plane parallel to the plane of movement of the arm and having positions of engagement with the plate to the front and rear of the arm, means for latching the link to the plate, and means for forcing the link out of latching engagement with the plate.

5. A mobile unit including an axle member, an arm pivotally mounted at each end of the axle member, a wheel on the lower end of each arm, a link pivotally mounted on the lower end of each arm for independent movement in a plane parallel to the plane of movement of the arm and having positions of engagement with the axle member on opposite sides of the arm, means for latching the link to the axle member, and means for forcing the link out of latching engagement with the axle member.

6. A mobile unit including an axle member, an arm pivotally mounted at each end of the axle member, a spindle on the lower end of each arm, a wheel on each spindle, and means pivoted on the axis of the spindle for movement in a plane parallel to said arm for fixing the arm to the axle member in inclined positions on opposite sides of the perpendicular through the pivot of the arm.

7. In a gun carriage, a mobile unit including an axle, parallel side frames rotatably mounted on the axle, a wheel associated with each side frame, a gun mount supported by the side frames and having a pair of trails each provided with a socket, depending members on the axle each engageable in a socket of the trails and a clamping member carried by the axle and engageable with the trails.

8. In a gun carriage, a mobile unit including an axle, parallel side frames rotatably mounted on the axle, a wheel associated with each side frame, a gun mount supported by the side frames and having a pair of trails, and a clamping member carried by the axle and engageable with the trails.

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