Aug. 29, 1950 C. A. DIEHR 2,520,713

SHOULDER BOW

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Fig. 1.

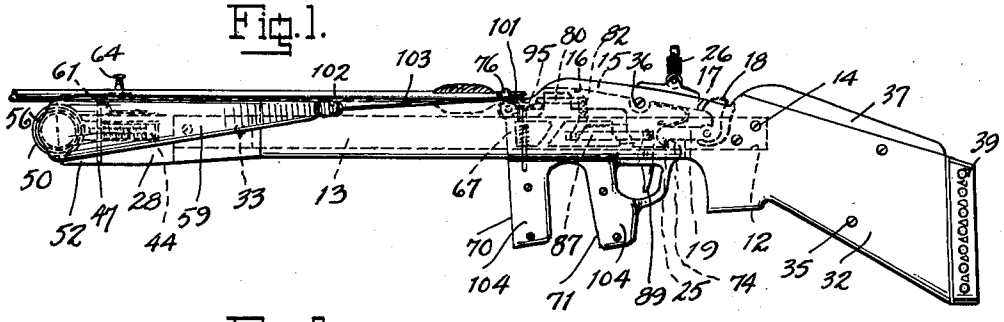


Fig. 2.

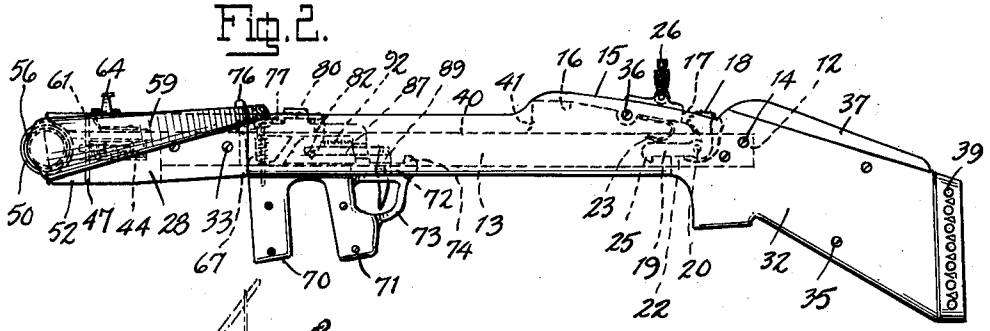
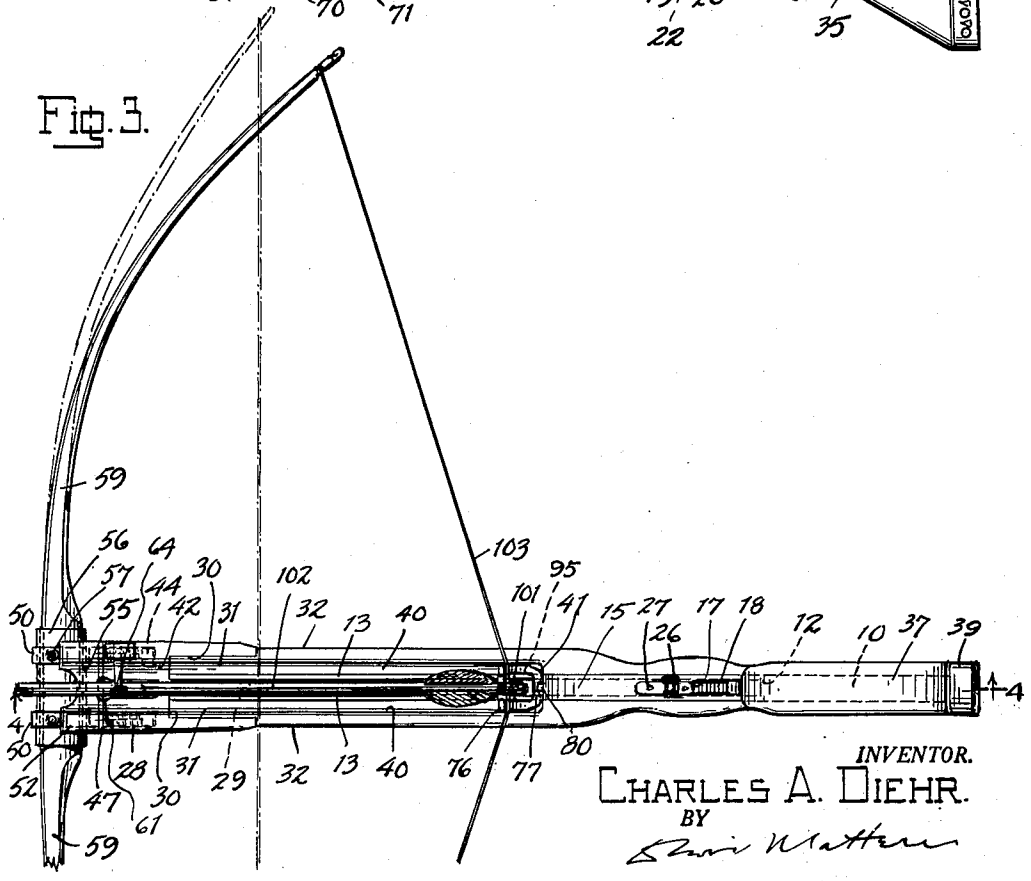


Fig. 3.



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Fig. 4.

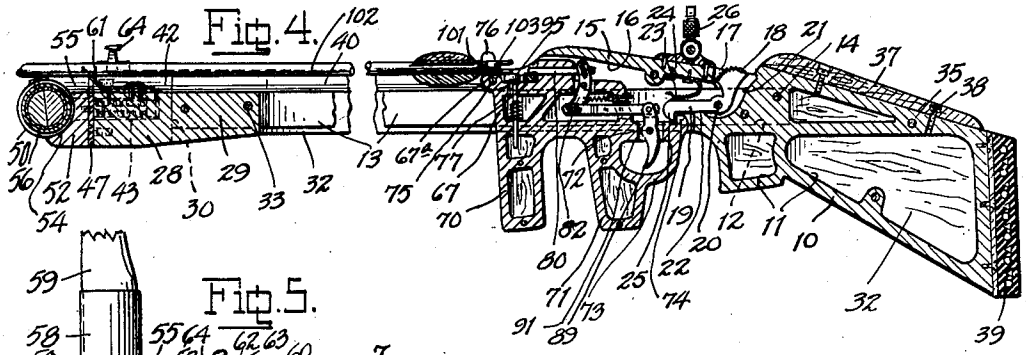


Fig. 5.

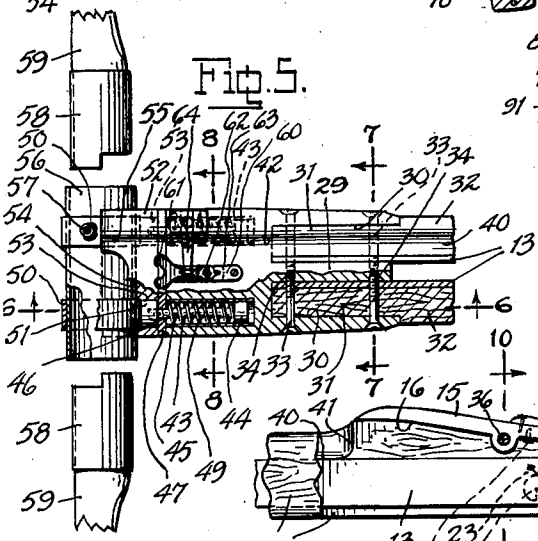


Fig. 9.

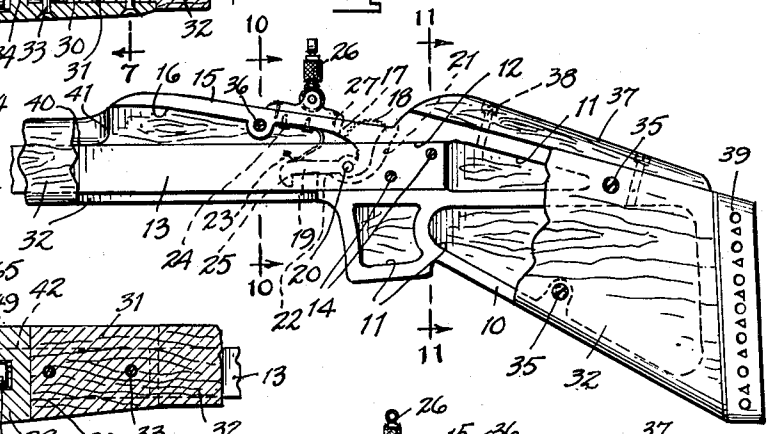


Fig. 6.

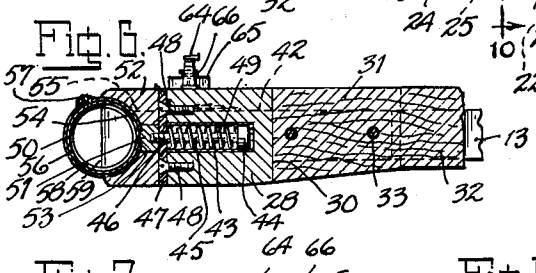


Fig. 7.

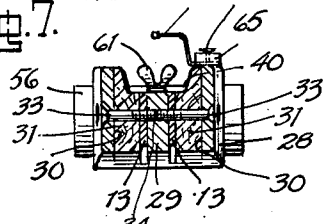


Fig. 8.

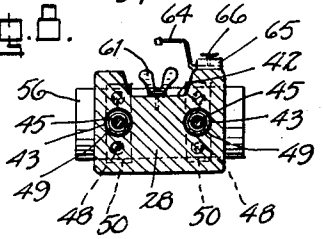


Fig. 10.

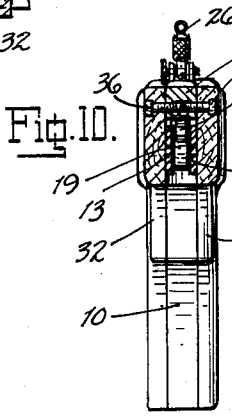
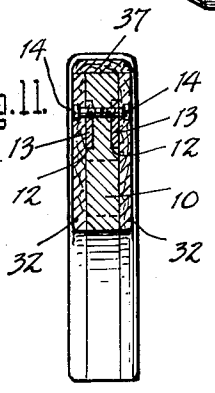


Fig. 11.



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Fig. 12.

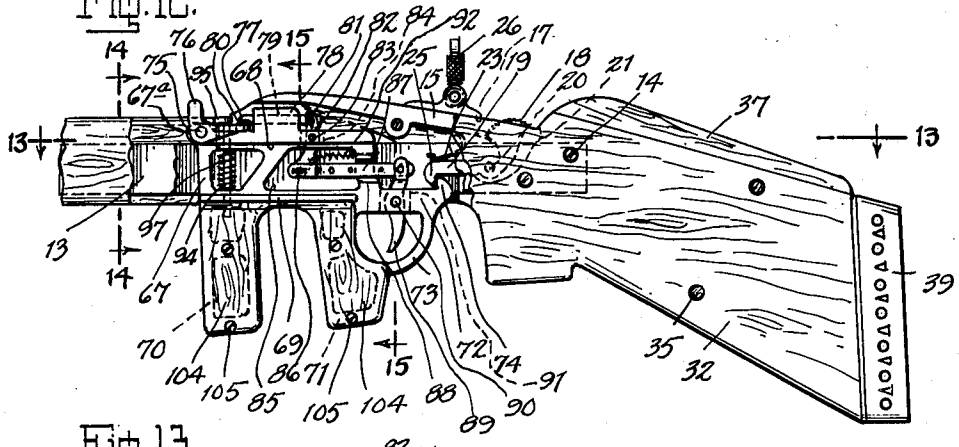


Fig. 13.

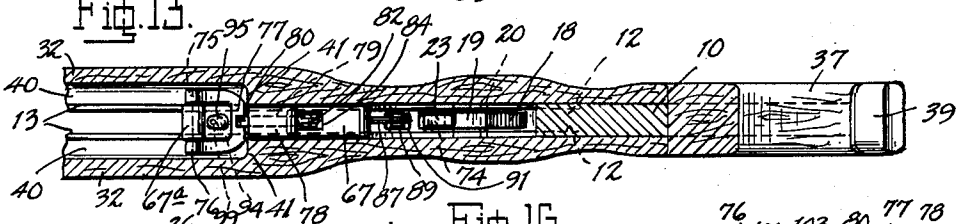


Fig. 14.

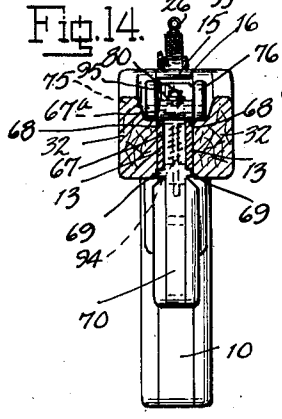


Fig. 15.

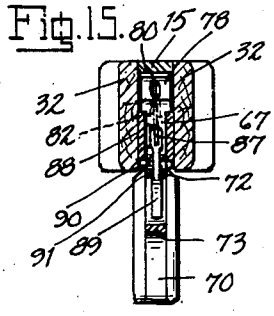


Fig. 16.

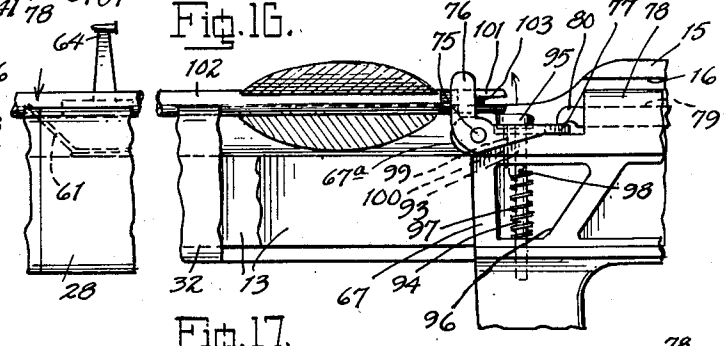
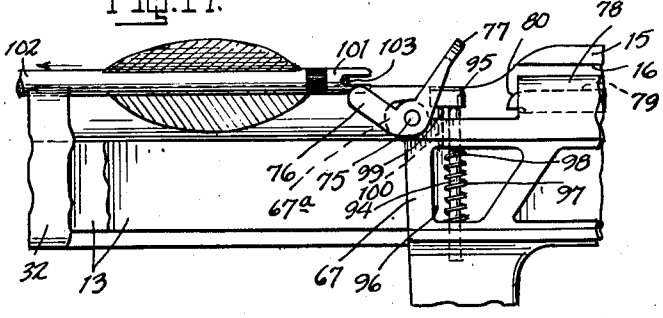


Fig. 17.



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Patented Aug. 29, 1950 2,520,713

UNITED STATES PATENT OFFICE

2,520,713

SHOULDER BOW

Charles A. Diehr, Fairfield, Conn.

Application June 11, 1946, Serial No. 675,916

5 Claims. (Cl. 124—25)

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The present invention relates to a shoulder bow for arrow shooting, and has for an object to provide a shoulder bow wherein relatively great propelling power may be applied to the arrow, which may be set preparatory to shooting with relative ease in comparison with the propelling power developed, and which may be sighted and fired with great precision by holding the stock against the shoulder in similar manner to the firing of a rifle.

A further object is to provide a shoulder bow having slide means for drawing the bow string, and which is adapted to be operated with the stock against the shoulder and through the use of both hands, to the end that relatively great force may be applied to the bending of the bow with a minimum of effort or strain upon the user. It is particularly proposed to provide a slide member having two handle parts arranged one behind the other for respective engagements by the two hands of the user.

It is further proposed to provide a shoulder bow in which the drawn bow may be gradually released when desired, without actuating the trigger mechanism normally employed in shooting an arrow.

Another object is to provide a bow wherein the slide means for drawing the bow carries with it retaining finger means for engaging the bow string and trigger means to release the retaining finger means.

Another object is to provide a shoulder bow in which the bow is yieldably supported at its central portion so as to relieve it of shock upon release of the bow string.

Another object is to provide yieldable pressure means arranged to engage the nock of the arrow shaft rearwardly of the bow spring to cause the arrow to be pressed downwardly at its forward end about the bow string as a fulcrum.

With the above and other objects in view, an embodiment of the invention is shown in the accompanying drawings, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of the shoulder bow, according to the illustrated exemplary embodiment of the invention, and showing the bow in its drawn position with an arrow in place.

Fig. 2 is a side elevation showing the bow in its released position, and with the bow-drawing slide member in its forwardly moved position preparatory to drawing the bow.

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Fig. 3 is a plan view, partially broken away, and showing the bow in its drawn position, as illustrated in Fig. 1, the dot-and-dash lines showing the released position of the bow.

Fig. 4 is a longitudinal vertical sectional view, partially broken away, and on a larger scale, taken along the lines 4—4 of Fig. 3.

Fig. 5 is a plan view partially in horizontal section, and on a further enlarged scale, of the forward or head end of the shoulder bow.

Fig. 6 is a longitudinal vertical sectional view, taken along the line 6—6 of Fig. 5.

Fig. 7 is a transverse vertical sectional view, taken along the line 7—7 of Fig. 5.

Fig. 8 is a transverse vertical sectional view, taken along the line 8—8 of Fig. 5.

Fig. 9 is a side elevation, partially broken away, of the stock end of the shoulder bow, the bow-drawing slide member being removed.

Fig. 10 is a transverse vertical sectional view, taken along the line 10—10 of Fig. 9.

Fig. 11 is a transverse vertical sectional view, taken along the line 11—11 of Fig. 9.

Fig. 12 is a side elevation, partially broken away, of the stock end of the bow gun, and showing the bow-drawing slide in place.

Fig. 13 is a horizontal sectional plan view, taken along the line 13—13 of Fig. 12.

Fig. 14 is a transverse vertical sectional view, taken along the line 14—14 of Fig. 12.

Fig. 15 is a transverse vertical sectional view, taken along the line 15—15 of Fig. 12.

Fig. 16 is a fragmentary detail view, on a still further enlarged scale, showing the bow string retaining finger member of the bow-drawing slide member in its retaining relation with the drawn bow string.

Fig. 17 is a similar view showing the released position of the retaining finger member.

Similar reference characters indicate corresponding parts through the several figures of the drawings.

Referring to the drawings, the shoulder bow, according to the illustrated exemplary embodiment of the invention, comprises a frame consisting of a stock frame member 10, preferably formed of aluminum or other suitable light metal, and having suitable cut-outs 11 therein for reduction of weight, there being rectangular recesses 12—12 at the forward end of the stock frame in its respective sides in which the rearward ends of a pair of bars 13—13 are secured by screws 14, the outer surfaces of these bars being flush with the outer surface of the stock frame, and the inner surfaces being spaced apart in parallel relation to provide a longitudinal slot for the bow-

drawing slide member, as will presently more fully appear. The stock frame is provided with a forwardly extending upwardly inclined portion 15 disposed in spaced relation above the rearward ends of the bars 13—13 to form a pocket 16 into which the bow-drawing slide member moves in its restracted position as shown in Fig. 4. At its rearward end the extension portion 15 is provided with a slot 17, in which is disposed the knurled thumb piece 18 of a retaining lever 19 for the slide member, pivotally mounted between the bars 13—13 upon a pivot pin 20, and movably disposed within a pocket formation 21 in the forward end of the stock frame, the stock frame being further provided at its forward end with an upwardly projecting stop seat 22, upon which the lever 19 is normally pressed in its retaining position by means of a leaf spring 23 secured to the under side of the extension portion 15 by means of screws 24. The lever 19 is provided at its forward end with a downwardly projecting catch 25 for retaining engagement with the bow-drawing slide member, as will presently more fully appear. The knurled surface of the thumb piece 18 is convexly curved and projects through the slot 17, so that it may be rolled back by engagement with the thumb to lift the retaining lever 19, for the purpose of releasing the bow-drawing slide member so that it can be moved forwardly. A rear sight assembly 26, of any suitable type, is secured by screws 27 upon the extension portion 15 forwardly of the slot 17, this sight being preferably of precision type capable of vertical and lateral and angular adjustments.

At their forward ends the bars 13—13 are secured to a head member 28, preferably formed of aluminum or other suitable light metal, having a central rearwardly projecting tongue portion 29 engaged between the forward ends of the bars 13 and having slot openings 30—30 at each side thereof for receiving the forward recessed ends 31 of the wood side pieces 32—32, the bars and the forward recessed ends of the side pieces being secured to the head member by means of screws 33 inserted from each side of the head member through holes in the side pieces and in the bars and screwed into threaded holes 34 provided in the tongue 29. The wood side pieces which are of walnut or other suitable material such as employed in gun stocks, extend rearwardly along the bars 13—13 and are shaped at their rearward ends to conform to the outline of the stock frame 10, being secured thereto by the screws 14 which secure the rearward ends of the bars, as well as by screws 35 engaged in the intermediate portions of the stock frame, and screws 36 engaged in the forwardly projecting extension portion 15. A wood top piece 37 for the stock is secured to the stock frame by screws 38, and a recoil shoulder pad 39, of rubber or the like, is preferably secured to the rearward end of the stock. The side pieces along the bars 13—13 project above the upper surfaces of the bars at each side and are recessed outwardly of the bars, as at 40—40, in flush relation with the upper surfaces of the bars to provide a longitudinal channel-way for the arrow, the recesses terminating in rear walls 41 substantially in line with the forward end of the extension portion 15 of the stock frame. The upper surface of the head member is also recessed, as at 42, in conformity with and in forward continuation of the channel way provided by the recesses 40.

The head member 28 is provided with a pair of cylindrical longitudinally disposed pockets 43—43, extending rearwardly from its flat forward surface and disposed outwardly of the recess 42, and in each of which is engaged a cylindrical plunger 44, having a forwardly projecting plunger rod 45, projecting through a passage 46 in a flat cover plate 47, secured to the forward flat surface of the head member by means of screws 48—48, a compression spring 49 being provided within the pocket between the plunger and the cover plate to normally retain the plunger in retracted position.

The forward ends of the plunger rods 45 are screw threaded and have secured to each of them a ring member 50 having an internally threaded socket post 51 rigidly secured thereto, and which socket post is screwed upon the threaded end of the plunger rod. A yoke piece 52 provided with cylindrical passages 53—53 therein is interposed between the cover plate 47 and the rings 50, the posts 51 being slidably engaged in the passages 53. The forward surface of the yoke piece is provided with a semi-cylindrical recess 54 in which the rings seat and is provided at its upper surface with a recess 55 conforming to and in forward continuation of the recess 42 of the head member 28. A cylindrical tube 56 is secured within the rings 50 by set screws 57—57, and is adapted to rotatably receive the recessed interlocking cylindrical end pieces 58—58 of the two staves 59—59 forming the bow.

Before assembly of the tube 56 the yoke piece 52 and the two ring members may be assembled to the plunger rods by screwing the ring members thereon, the forward yielding of the plunger rods permitting the ring members to be screwed inwardly to a point where they seat in the yoke member under spring action and where the desired tension is applied to the springs. Upon assembly of the tube 56 the two ring members form a unit therewith which is yieldable forwardly with respect to the head member 28, for the purpose of yielding to the forward shock or impact of the central portion of the bow when the latter is released in the shooting of an arrow, thus preventing excess strain upon the central portion of the bow and breakage of the staves, and such as might occur if the bow were held rigidly to the head member. This forward yielding of the central portion of the bow is similar to the forward yielding that takes place at the center of a hand held bow, the hand yielding forwardly naturally upon release of the drawn bow to relieve the shock.

Within the recess 42 of the head member there is mounted upon a base plate 60 a forked guide 61, for supporting and guiding the forward end of the arrow shaft, this guide being pivotally mounted by means of a set-screw 62, so that it may be angularly adjusted with respect to calibrations 63 provided upon the base plate 60. A front sight member 64 is adjustably mounted above the guide 61 for inward and outward lateral adjustment in a block member 65 secured upon the head member at one side of the recess 42, and is adapted to be fixed in its position of adjustment by means of a set screw 66.

The bow-drawing slide member is mounted for longitudinal sliding movement along the guideway provided by the bars 13—13, and comprises a frame 67 formed of steel or other suitable metal, its upper portion projecting above the upper sides of the bars and being relatively wider than the portion between the bars to provide longitudinal shoulders 68 at each side for sliding engagement with the upper sides of the

bars, and being provided below the bars with longitudinal ribs 69—69 for sliding engagement with the lower sides of the bars. The frame is provided at its lower portion with two longitudinally spaced downwardly projecting hand grip portions 70 and 71, and in back of the rearward hand grip portion 71 is provided with a trigger supporting extension 72 and a trigger guard 73, the trigger extension 72 being provided at its rearward end with an upwardly projecting nose 74 adapted to be lockingly engaged by the catch 25 of the retaining lever 19 in the retracted position of the slide. The two hand grip portions 70 and 71 are covered at each side with side pieces 104 of wood or other suitable material secured by screws 105.

At the forward end of the upper portion of the slide and disposed above the upper sides of the bars 13 there is provided a bearing portion 67a upon which there is pivotally supported by means of a cross pin 75 the bow string engaging finger member 76. This member is of yoke form, its side legs being engaged at the sides of the bearing portion and having upwardly extending finger portions normally disposed in vertical position at each side of the bearing portion within the channel way recesses 40. At its rearward end there is provided a connecting portion 77 adapted to rest upon the upper surface of the slide member in the normal retaining position of the finger member, as seen in Figs. 12 and 16. Rearwardly of the finger member the slide member is provided with an upwardly projecting bearing portion 78 having a longitudinal passage 79 therethrough, in which is slidably engaged a latch member 80 adapted in its projected position to engage over the portion 77 of the finger member, and adapted upon being retracted, as will presently more fully appear, to release the finger member so that it may swing forwardly about its pivot, as shown in Fig. 17.

The rearward projecting end of the latch member 80 is connected by a pivot and slot connection 81 to a lever 82, pivotally mounted at 83 in a slot 84 at the upper side of the slide member, its lower end projecting into an opening 85 provided in the slide member, and being pivotally connected by a pin and slot connection 86 to a draw bar 87. The draw bar extends through a passage 88 in the slide member and is pivotally connected at its rearward end to the upper end of the trigger 89, the trigger being pivotally mounted upon a pin 90 in a slot 91 of the rearwardly projecting portion 72 of the slide member. A spring 92 is connected between the lever 82 and the rearward end of the slide member and normally exerts projecting force upon the latch member 80.

Within the opening of the yoke shaped finger member 76 the slide member is provided with a vertical passage 93, in which is engaged a plunger rod 94 provided at its upper end with a head 95, its lower end extending downwardly in an opening 96 in the slide member and having engaged thereon within the opening a helical compression spring 97, disposed between the lower end of the opening and a pin 98 upon the rod, and which normally projects the rod upwardly. The head 95 is provided with a dowel pin 99, slidably engaged in a passage 100 in the upper side of the slide member to prevent relative turning movement of the head and plunger rod. The head 95 is adapted to be engaged by the rearward end or nock 101 of the arrow shaft 102 at a point rearwardly of the bow string 103 engaged

in the notch of the nock, the bow string being engaged at each side of the nock by the upwardly projecting laterally spaced fingers of the finger member 76. Thus upward pressure is exerted upon the nock of the arrow shaft rearwardly of the bow string, the latter constituting a fixed fulcrum about which turning force is applied to the arrow shaft by upward pressure upon its rearward end, causing its forward end to be forced downwardly into engagement with the forked guide member 61. The arrow is thus held against accidentally rising upwardly at its forward end or assuming an out-of-line position after the bow has been drawn. It will be understood that the spring of the plunger is relatively light, and, while its exerts sufficient force upon the arrow to retain it in position, its force is insufficient to force the drawn bow string upwardly upon the retaining fingers.

In operation, the bow-drawing slide member is released from the retaining lever 19 and moved forwardly to the position shown in Fig. 2, whereupon the bow string is engaged behind the fingers of the finger member 76, the notch of the arrow being engaged by the string between the fingers and the nock of the arrow being pressed downwardly to depress the head 95 of the plunger rod 94. Thereupon, with the stock of the shoulder bow preferably engaged with the shoulder, the slide member is gripped by both hands, one hand engaging the forward hand grip 70 and the other of the rearward hand grip 71 and the slide member is drawn to its rearward position to draw the bow, the retaining lever 19 automatically snapping into retaining engagement with the nose 74. In this position the drawn bow string is relatively fixed in its relation with the finger member 76, and constitutes a fixed fulcrum about which the arrow is tilted through upward pressure upon the nock exerted by the plunger 94 to press its forward end downwardly into firm engagement with the forked guide 61. Thus moving about of the shoulder bow will not cause the arrow to accidentally swing out of its operative relation with the guide 61.

In order to shoot the arrow the shoulder bow is held at the shoulder in similar manner to the holding of a rifle and is sighted by aligning the rear and front sights in the usual manner. Upon pulling the trigger the latch member 80 is withdrawn from retaining engagement with the finger member 76, allowing the latter to swing forwardly, as shown in Fig. 17, and releasing the bow string, the latter being guided along the upper surfaces of the side pieces 32 at each side of the longitudinal recesses 40. As the drawn bow is released and moves to its normal position, as shown in Fig. 2 the forward shock or impact of the central portion of the bow is taken up through the forward yielding of the tube 56 permitted by the spring mounted plunger rods, thus preventing excess strain upon the central portion of the bow and possible breakage of the staves.

Should the user decide after drawing the bow that he does not desire to shoot the arrow, the slide member may be released by lifting the retaining lever 19 while holding the slide member by one or the other hand grip portions, and thereupon allowing the slide member to gradually move in its forward position without the necessity for actuating the trigger to release the bow string.

I have illustrated and described a preferred and satisfactory embodiment of the invention, but it will be understood that changes may be

made therein, within the spirit and scope thereof, as defined in the appended claims.

What is claimed is:

1. In a shoulder bow including a stock, and a forestock supporting at its forward end a bow extending at each side and having a bow string disposed transversely across said forestock in a normally straight horizontal position, the combination comprising a longitudinal slideway carried by said forestock having a pair of longitudinal guide surfaces for guided engagement by said bow string, one guide surface being at each side of said slideway to define a longitudinal arrow receiving space between them, a bow-drawing slide member engaged in said slideway for longitudinal movement between forward and retracted positions, retaining means movably mounted in relation to said slideway for releasably retaining said slide member in its retracted position, a bow string engaging finger member movably carried by said slide member having a forked part movable between an operative position to engage and retain the forward edge of said bow string at each side of the nock of an arrow engaged therewith, and movable to an inoperative position out of the path of guided movement of said bow string along said guide surfaces, and a releasable catch member movably carried by said slide member and engageable with said finger member to releasably retain it in operative position, and whereby said bow string and arrow may be drawn through movement of said slide member to retracted position and whereby said finger member upon release by said catch member is movable under the pull of said drawn bow string out of the path of guided movement of said bow string along said guide surfaces.

2. The invention as defined in claim 1, further characterized by spring loaded pressure means movably carried by said slide member rearwardly of said forked part of said finger member to engage and exert upward pressure upon the nock of the arrow to tilt it about said bow string as a fulcrum.

3. The invention as defined in claim 1, further characterized by arrow supporting guide means carried by said forestock forwardly of said bow string, and spring loaded pressure means movably carried by said slide member rearwardly of said forked part of said finger member to engage and exert upward pressure upon the nock of the arrow to tilt it about said bow string as a fulcrum into engagement with said guide means.

4. In a shoulder bow, a frame having a head member at its forward end, a spring-loaded bow supporting member movably connected to said head member for limited movement between forward and rearward positions, its spring load movably retaining said bow supporting member in its rearward position and permitting its forward yielding movement, and a bow carried by said bow supporting member having a bow string adapted to extend transversely across the upper side of said frame.

5. In a shoulder bow, a frame having a head member at its forward end, a bow supporting member having spring loaded plunger means engaged in said head member for forward yielding movement, and a bow carried by said bow supporting member having a bow string adapted to extend transversely across the upper side of said frame.

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