March 14, 1950 H. L. BAILEY 2,500,509

CROSSBOW

Filed Dec. 3, 1945 2 Sheets-Sheet 1

Fig. 1.

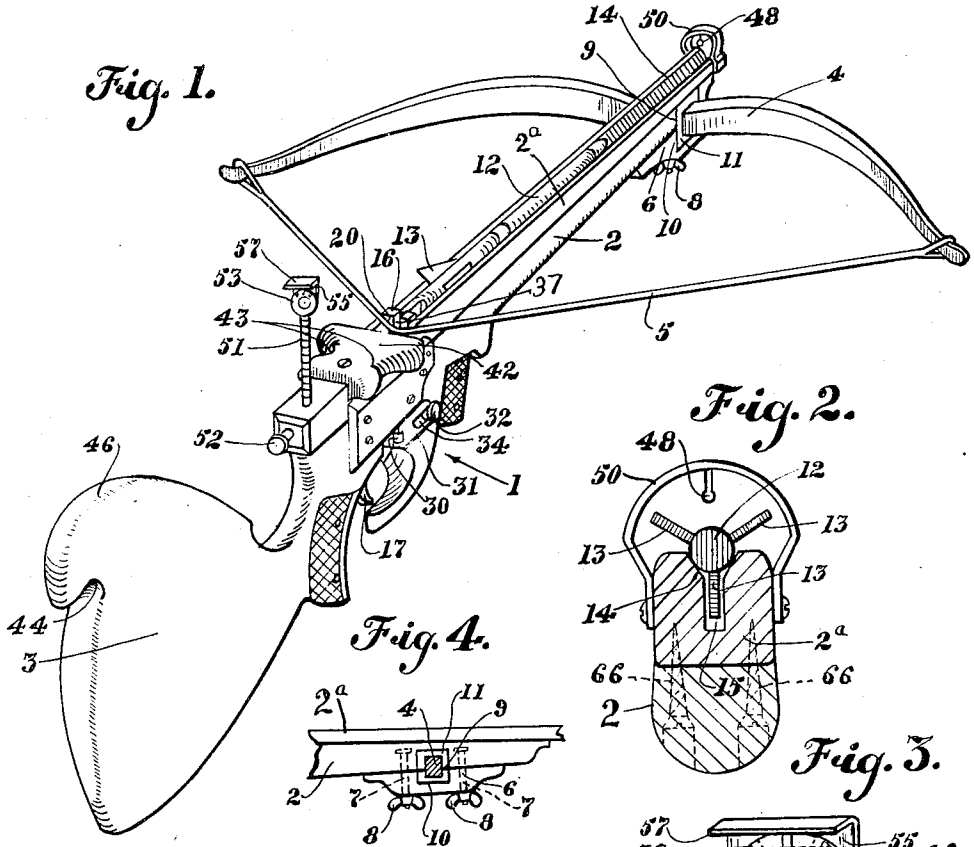


Fig. 2.

Fig. 4.

Fig. 3.

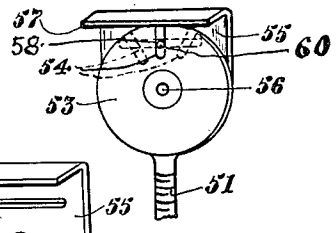


Fig. 5.

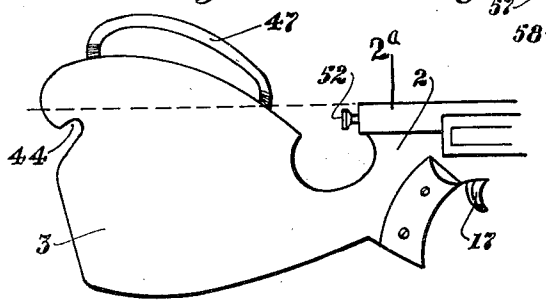
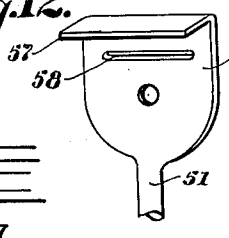


Fig. 12.



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March 14, 1950 H. L. BAILEY 2,500,509

CROSSBOW

Filed Dec. 3, 1945 2 Sheets-Sheet 2

Fig. 6.

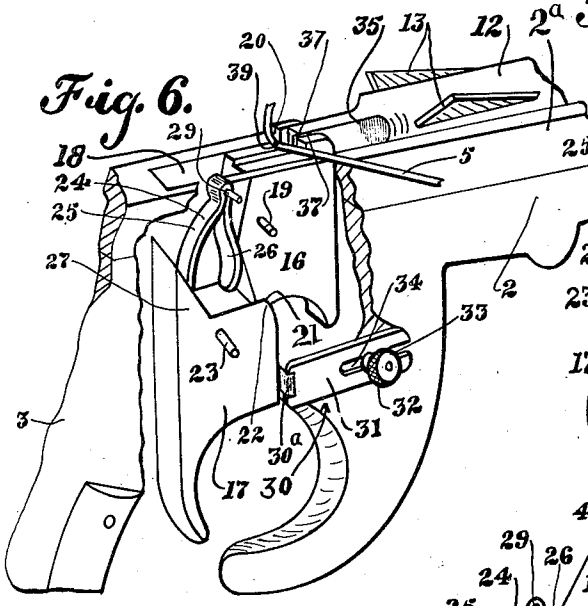


Fig. 10.

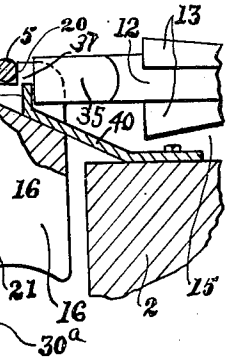


Fig. 7.

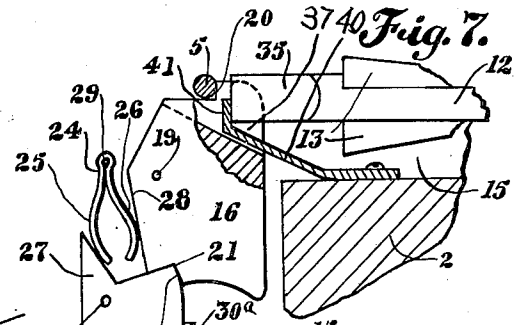


Fig. 8.

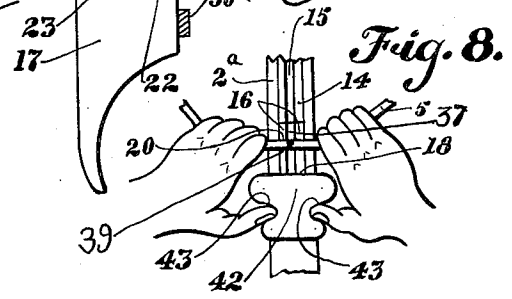


Fig. 9.

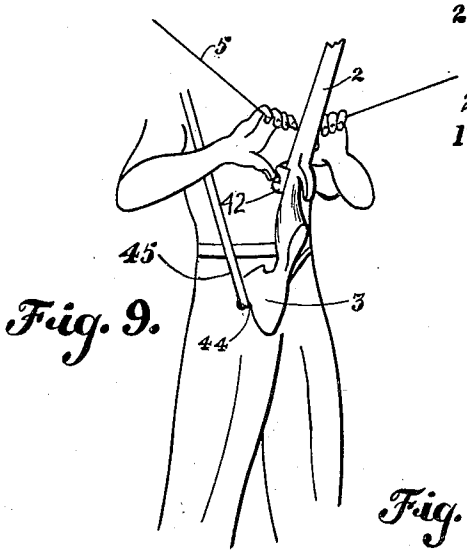
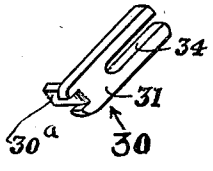


Fig. 11.



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UNITED STATES PATENT OFFICE

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CROSSBOW

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Application December 3, 1945, Serial No. 632,300

4 Claims. (Cl. 124—25)

1

This invention relates to crossbows and it has for one of its objects to provide a crossbow which is constructed to be used with arrows which are feathered in the same way as arrows which are used with the conventional longbow.

A further object of the invention is to provide a crossbow with novel means for regulating the amplitude of movement of the trigger necessary in order to release the arrow.

Further objects of the invention are to provide various other improvements in crossbows which will be more fully hereinafter described and then set forth in the claims.

In the drawings, wherein I have illustrated a selected embodiment of the invention,

Fig. 1 is a perspective view of a crossbow embodying my invention.

Fig. 2 is a sectional view through the barrel portion showing the front sight.

Fig. 3 is a view of the rear sight.

Fig. 4 is a fragmentary view showing the manner in which the bow element is attached to the barrel portion.

Fig. 5 is a fragmentary view showing a modified form of the invention.

Fig. 6 is a fragmentary perspective view with parts broken out illustrating the catch or sear member and the trigger as well as the trigger stop.

Fig. 7 is a fragmentary sectional view illustrating not only the trigger and catch member or sear member, but also the arrow stop.

Fig. 8 is a view showing the manner in which the anchor member is used by the archer in drawing the string and engaging it with the catch member.

Fig. 9 illustrates the manner in which the crossbow may be held while the string is being drawn into engagement with the catch member.

Fig. 10 is a view similar to Fig. 7 but showing the trigger stop set for hair trigger action.

Fig. 11 is a perspective view illustrating the trigger stop.

Fig. 12 is a perspective view of the plate portion of the rear sight.

The crossbow herein illustrated is made with a stock 1 having the barrel-supporting portion 2 and the butt 3, and a barrel element 2a which is mounted on the barrel-supporting portion 2 of the stock. Said barrel 2a and barrel-supporting portion 2 of the stock constitute what may be called the barrel portion of the crossbow.

The bow element is indicated at 4, and 5 indicates the string for the bow.

The bow is secured to the outer end of the barrel-supporting portion 2 and it is clamped thereto by means of a clamping member 6 which is secured to the underside of the barrel-supporting portion of the stock by clamping screws 7 which extend through the clamping member and are provided with clamping nuts 8. The portion 2 of the stock is formed on its underside with a transverse notch 9 and the clamping member 6 is provided with a mating notch 10. The bow 4 extends through the mating notches and the portion of the bow within the notch is encircled by a cushion member 11 of rubber or some other slightly resilient material, the purpose of this being to absorb any jar or kick incident to the release of the string 5.

2

The arrow 12 which is used with my improved crossbow is feathered in the conventional manner employed in feathering arrows that are used with the well known longbow, that is, the arrow 12 is provided with the three feathers 13 equally spaced around the circumference of the arrow.

The barrel element 2a is formed in its upper face with a V-shaped arrow-receiving groove 14 in which the arrow 12 rests, and it is also formed with a feather-receiving slot 15 situated below but communicating with the groove 14, said slot 15 being of a width to receive one of the feathers 13 as shown in Fig. 2.

When the arrow to be shot is placed in the groove, it has a line contact with each of the walls of the V-shaped slot 14 while the feather on the bottom of the arrow is freely received in the slot 15. The barrel 2a may be secured to the barrel-supporting portion of the stock in any desirable way. As herein shown, it is held in place by means of screws 66.

By making the barrel as a separate piece from the stock, it is possible to use a harder and more expensive wood for the barrel than is necessary for the stock, thereby providing a barrel having an arrow-receiving groove which has a minimum tendency to warp.

The crossbow is provided with a pivotally mounted catch member or sear member 16 adapted to engage the string 5 when the bow is fully drawn, and with a trigger member 17 which normally holds the sear or catch member 16 in operative position as usual in crossbows.

The sear or catch member 16 is situated within a slot 18 formed in the stock 1 and the rear end of the barrel element 2a, said catch member being pivotally mounted on a suitable pivot pin 19 and being provided with a string-engaging shoulder 20. The catch member 16 is also provided with a second notch or shoulder 21 adapted

to be engaged by the portion 22 of the trigger 17. Said trigger is also situated within the slot 18 and is pivotally connected to the stock by the pivot pin 23 which is located below the pivot pin 19 for the sear or catch member.

When the trigger is in engagement with the shoulder 21 of the catch member, the latter will be held in its operative position and in a position to hold the string fully drawn as shown in Figs. 1 and 6. When the trigger is pressed rearwardly, the portion 22 thereof is moved out of engagement with the shoulder 21 thereby releasing the sear or catch 16 and consequently releasing the string for the discharge of the arrow. The edge surface of the portion 22 of the trigger which engages the sear or catch member 16 is preferably formed on an arc struck from the pivotal axis 23 of the trigger. As a result of this construction, the trigger will have an easier action and the catch member will remain stationary while the trigger is being pulled and until the portion 22 of the trigger clears the shoulder 21 of the catch member.

I have provided herein novel means for automatically setting both the catch member and the trigger. Such means comprises a spring element 24 which is provided with two resilient arms 25 and 26, the arm 25 pressing against the portion 27 of the trigger above its pivot 23 and the arm 26 pressing against the wall 28 of the catch member below its pivot 19. This spring is mounted in the slot 18 of the stock and is shown as pivotally carried on a pin 29 situated rearwardly of the catch member so that said spring element can swing about its pivot as necessary to maintain its two arms in engagement with the catch member and trigger member. Because of the free swinging movement of the spring element 24, both the catch member and the trigger are subjected at all times to an identical yielding pressure which is the combined resilient action of both arms 25, 26 of the spring.

When the trigger is pulled to release the catch member, it has a clockwise movement in Figs. 6 and 7 during which movement the spring member 24 will be compressed.

As soon as pressure on the trigger is released, the expanding movement of the spring 24 will swing the catch member 16 counterclockwise and will also swing the trigger member 17 in a counterclockwise direction, thereby automatically bringing the portion 22 of the trigger into engagement with the shoulder 21 of the catch member.

With this invention, therefore, after the trigger has been pulled for the discharge of the arrow and then has been released, the trigger and the catch member will be automatically set in their operative positions with the shoulder 20 of the catch member in position ready to again receive the string 5 when it is fully drawn.

I have provided herein a trigger stop by which the amplitude of movement of the trigger necessary to release the catch can be regulated. This stop may be set so as to require a relatively long pull of the trigger in order to release the catch or it may be so set that the catch will be released by a very short pull, thereby giving the crossbow a hair trigger action.

The trigger stop is indicated at 30 and it is herein shown as comprising a plate 31 which is adjustably clamped to the side of the stock by a clamping nut 32 screw-threaded to a stud which extends through a slot 34 with which the plate 31 is provided and which extends in the direction of the length of the barrel 2*a*. The rear end of

the plate has a stop projection 30*a* which extends laterally inwardly and is situated in front of the trigger member and which limits its forward swinging movement.

When the stop 30 is in the position shown in Fig. 7, the engagement of the trigger with the shoulder 21 of the catch is such that it requires the maximum length of pull of the trigger to release the catch member 16.

On the other hand, if the stop is adjusted to the left in Fig. 6 into the position shown in Fig. 10, then the portion 22 of the trigger has only a slight engagement with the shoulder 21 of the catch member and a very small movement of the trigger will release the catch, thus giving the parts a hair trigger action.

In using the crossbow, the bow element will first be drawn and the string brought into engagement with the string-engaging shoulder 20 of the catch, after which the arrow 12 is placed in the groove 14. The crossbow is then ready to be shot.

The sides of the arrow are cut away at the rear end as shown at 35, thereby to provide a relatively thin end and the sear or catch member 16 is formed with a slot 37 in which this thin rear end of the arrow is received when the arrow is loaded into the crossbow. This construction provides means which insures that when the arrow is being placed in the groove, one of the feathers of the arrow will be properly located in the feather-receiving slot 15.

The arrow cannot be placed against the arrow stop 41 except when the thin rear end of the arrow is occupying the slot 37 of the catch member 16, and the arrow is so made that the flat sides 35 on the arrow occupy planes parallel to the plane of one of the feathers, and hence when the arrow is loaded into the gun with the end against the stop 41, one of the arrows will be properly positioned in the feather-receiving groove 15.

The string 5 is preferably provided with a mark 39 at its center and if the string is properly drawn and hooked over the shoulder 20 of the catch, this indication mark 39 should be at the center of the slot 37. However, in drawing the string and hooking it over the catch it may sometimes happen that the center mark of the string will not be located exactly at the center of the slot 37 and if this condition existed and the arrow was resting against the string at the time that the trigger was pulled, the tendency of the string to straighten out would be liable to throw the arrow off from its true course.

I have, therefore, provided an arrow stop which holds the arrow slightly separated from the string so that if, when the trigger is pulled to release the catch, the center mark of the string is not in the exact center of the slot, said string will have an opportunity to straighten itself before it actually strikes the arrow.

This arrow stop is indicated at 40 and is in the form of a strip of metal secured to the bottom of the slot 15 and extending rearwardly into the slot 37 of the catch, the end 41 of the stop being bent upwardly and adapted to engage the end of the arrow. The relation of the stop to the drawn string 5 is shown in Fig. 7 from which it will be obvious that when the arrow is resting against the stop 41 and the drawn string is hooked over the shoulder 20, said string will be spaced a distance from the end of the arrow.

In order to facilitate drawing the string and hooking it over the shoulder 20 of the catch, I have provided an anchoring member 42 which is

mounted on the top of the stock immediately back of the catch and which is provided with two laterally extending shoulder portions 43 which extend outwardly beyond the sides of the stock and against which the archer may brace his thumbs while pulling backwardly on the string to hook it over the shoulder 20 as shown in Figs. 8 and 9.

In order to further assist the archer in drawing the bow and hooking the string over the shoulder 20 of the catch, I propose to make the butt 3 of the crossbow with a notch 44 which can be engaged with a sling or strap 45 that the archer wears over his shoulder as shown in Fig. 9. This sling or strap will thus hold the crossbow in the position shown in Fig. 9 and in a convenient position for the archer to grasp the string 5 and pull it downwardly sufficiently to hook it over the shoulder 20 of the catch.

The crossbow is provided with a front sight 48 and a rear sight. The front sight 48 is in the form of an inverted bead which is suspended from a loop shaped bracket 50 that is attached to the muzzle end of the barrel portion.

The rear sight is in the form of a peep sight and is herein shown as carried by a vertical stem 51 which sets into an aperture with which the barrel element 2a and the stock are provided and which can be adjusted vertically in said aperture, said peep sight being retained in adjusted position by a clamping screw 52 carried by the rear end of the barrel element 2a. The rear sight herein shown comprises a plate member 55 which is rigid with the stem 51 and is provided with a horizontal slot 58. Pivotally mounted at 56 on the plate 55 below the slot and in face to face contact therewith on the side thereof facing the archer, is a disk 53 which is provided with a radial slot 54 that crosses the horizontal slot 58 of the plate 55. These two slots provide a peep opening 60 at the point where they cross and in aiming the gun, the archer sights through the peep opening 60 to bring the bead 48 of the front sight onto the target.

If there is a strong cross wind, it is necessary to make an adjustment of the sight to compensate for such cross wind. This is done by turning the disk 53 in one direction or the other thereby to move the radial slot 54 of the disk to one side or the other of a central position as shown by dotted lines in Fig. 3. Such turning movement of the disk 53 will shift the position of the peep opening 60 to one side or the other of a central position thereby providing the necessary correction to compensate for the action of a cross wind on the arrow while in flight.

The plate 55 is shown as having a rearwardly extending flange 57 at its upper side to provide a shield.

The butt portion 3 of the stock of the crossbow is shaped to present the upwardly extending portion 46 that provides a cheek rest, against the top edge of which the archer may rest his cheek while using the crossbow. This extension 46 is so formed that the top edge thereof is located a substantial distance above the line of the top edge of the barrel as shown best in Fig. 5 wherein the dotted line indicates the extension of the line of the top edge of the barrel. The top edge of this extension 46 extends forwardly and downwardly from its highest point, and as stated above, provides a cheek rest against which the archer may rest his cheek while shooting with the crossbow.

The butt may be made so that the top or cheek rest part 46 is located sufficiently above the line of the barrel of the gun to function properly as presently will be described, or the butt may be made with the extension member 47 which provides the surface against which the archer may rest his cheek. In either event the cheek-engaging surface, whether it be the top edge of the extension 46 of the stock or the extension member 47, is located a substantial distance above the axial line of the barrel.

The purpose of this construction is to provide a crossbow which has a cheek-engaging portion against which the archer may rest his cheek for the purpose of steadying the crossbow when shooting it at all of the various ranges that are commonly used in archery, that is ranges varying from thirty yards up to one hundred yards.

The propulsive power of a crossbow is such that in shooting at the one hundred yard range it is necessary to raise the rear sight a considerable distance above the barrel as shown in Fig. 1 so that when the bow is being aimed, the barrel will have a very definite upward inclination, an inclination sufficient to give the arrow the proper trajectory to hit the target. When shooting at the short thirty yard range however, the aiming of the crossbow is more on the order of a point blank proposition, and the rear sight is adjusted down relatively close to the barrel.

In this invention the cheek rest portion of the butt, which as stated above is located at a very considerable distance above the axial line of the barrel, is such that when the rear sight is adjusted upwardly a considerable distance above the barrel for shooting at the long one hundred yard range, the high point of the extensions 46 or 47 has a position so that the archer may rest his cheek firmly thereagainst and yet have his sighting eye at the proper location for sighting through the rear sight.

For shooting at the short range with the rear sight adjusted relatively close to the barrel, the archer may rest his cheek against the low portion of the extensions 46 or 47 and thereby still have his eye properly positioned for sighting through the rear sight.

When shooting at an intermediate range such as sixty yards, the archer will rest his cheek against an intermediate portion of the top edge of the cheek rest portion.

To provide a cheek rest which is available to the archer in shooting at the extreme ranges of thirty yards and one hundred yards and also at intermediate ranges, it is necessary that the top edge of the extensions 46 or 47 against which the archer may rest his cheek should be located a very considerable distance above the axial line of the barrel.

While I have illustrated herein a selected embodiment of my invention, I do not wish to be limited to the constructional details as various changes may be made in some of the parts without departing from the invention.

I claim:

1. A crossbow having a stock provided with an arrow-receiving groove, a catch member pivotally carried by the stock and provided with a string-engaging shoulder and a trigger-engaging shoulder, a trigger pivoted to the stock and engageable with the trigger-engaging shoulder, said catch member having a vertical slot extending from a point in the rear of the string-engaging shoulder to its front edge, and an arrow stop carried by the stock and having an arrow-positioning portion occupying said slot and situated in front of said string-engaging shoulder.

2. A crossbow having a stock, a catch member pivotally carried by the stock and provided with both a string-engaging shoulder and a trigger-engaging shoulder, a trigger pivoted to the stock, a spring acting on said trigger and yieldingly holding it in shoulder-engaging position, an adjustable trigger stop for engaging the trigger and by which the extent of trigger movement necessary to release the catch may be regulated, said trigger stop comprising a plate member overlying the side of the stock and having a slot extending in the direction of the length thereof, a stationary stop projection rigid with said plate and extending inwardly laterally from the rear end thereof into position to be engaged by the trigger and to limit the spring impelled movement thereof, and a clamping screw occupying said slot and by which the plate is adjustably clamped to the stock.

3. A crossbow for shooting a feathered arrow having at its rear end two flat sides parallel with one of its feathers, said crossbow having a barrel portion provided with an arrow-receiving groove and a narrow feather-receiving slot below and communicating with said groove and adapted to receive a feather of an arrow occupying said groove, a pivotally mounted trigger controlled catch having a rearwardly facing string-engaging shoulder, the portion of the catch in front of the shoulder having a vertical arrow-positioning slot extending to the front edge of the catch and having a transverse dimension to fit the flat sided rear end of the arrow, whereby said slot serves to hold the arrow in proper position with its feather in the feather-receiving slot.

4. A crossbow comprising a stock having a barrel portion to receive the arrow and a butt portion, and a vertically adjustable rear sight having a wide range of adjustment between a position relatively close to the barrel for shooting at short ranges and at an elevated position at a considerable distance above the barrel for shooting at long ranges, the butt portion of the stock extending upwardly a considerable distance above the line of the top edge of the barrel portion, the

top edge of said extended portion inclining downwardly and forwardly and constituting a cheek rest against which an archer may press his cheek to assist in holding the crossbow steady while it is being shot, the high portion of said top edge of the butt being located a considerable distance above the line of the top of the barrel and at a point to provide a proper cheek rest for the archer when sighting through the rear sight as it is adjusted to occupy an elevated position for shooting at a long range, and the lower portion of said top edge of the butt being located relatively close to the line of the top edge of the barrel and at a point to provide a proper cheek rest for the archer when sighting through the rear sight as it is adjusted into its low position for shooting at short ranges.

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