

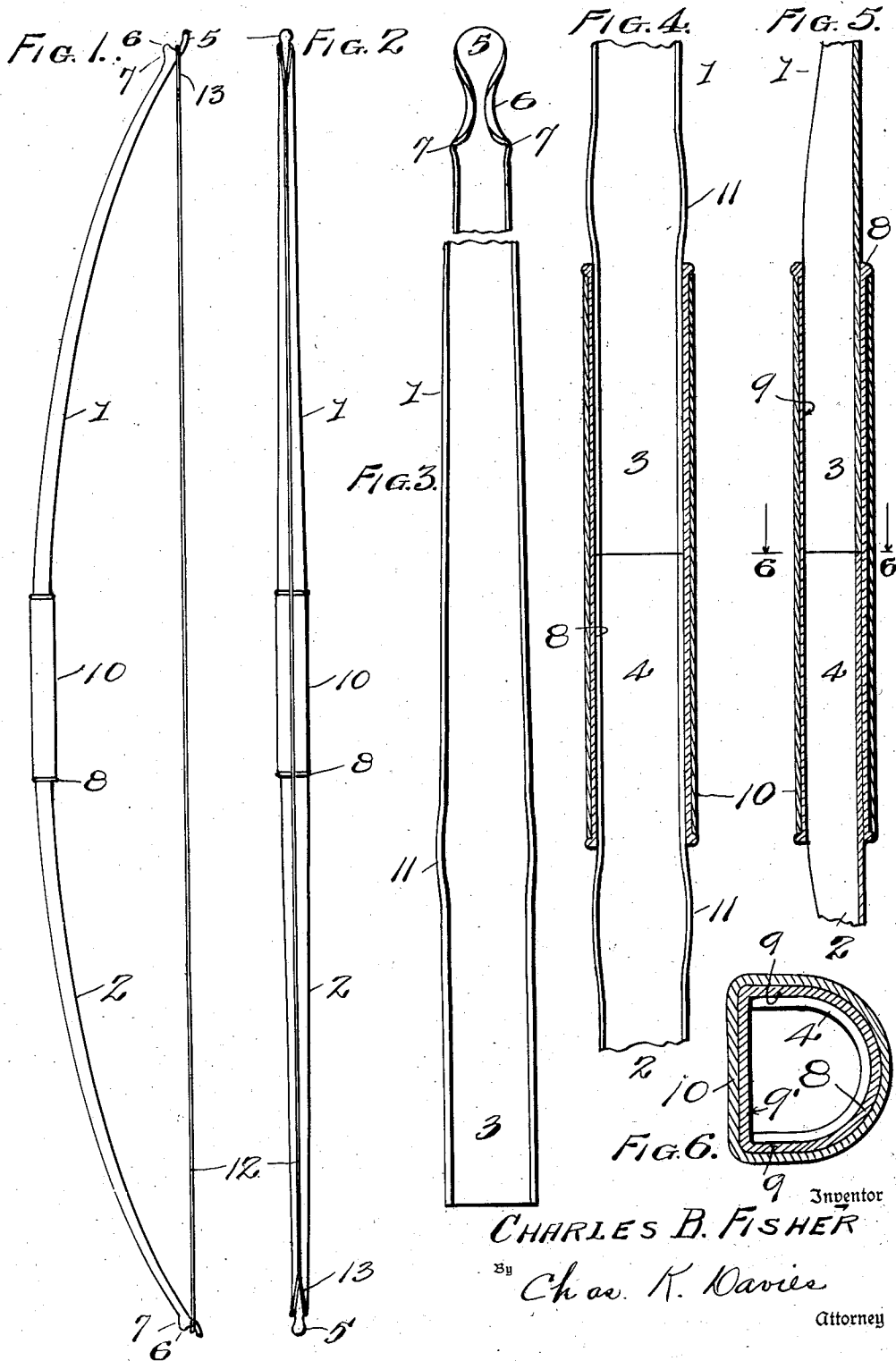
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BOW

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BOW

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My present invention relates to improvements in bows for use in archery, and specifically, the invention relates to the type of separable bows fashioned from resilient or spring metal, such as steel, or other appropriate material.

By the utilization of the principles of my invention the bows may be manufactured in quantities, and in various sizes, at comparatively low cost of production; the parts of the bow may readily be assembled for use, and with equal facility the parts may be separated and compactly arranged when desired for shipping, storing, or for transportation of the equipment.

The two limbs of the bow, which are separable from the handle portion, are identical in size, weight, and strength, and therefore the parts, when assembled, insure the necessary coordination for uniformity in alinement, strength, and equilibrium, when the bow is being used.

Because of the minimum number of parts employed in the bow, and of the intimate relation of these parts, the bow possesses an unusual degree of accuracy, and a maximum of efficiency with a minimum of weight, and the construction of the bow according to my invention enhances the durability of the device.

The invention consists in certain novel features of construction, combinations, and arrangements of parts, as will hereinafter be more fully set forth and claimed.

In the accompanying drawing I have illustrated one of the physical embodiments of my invention wherein the parts are combined and arranged according to the best mode I have thus far devised for the practical application of the principles of my invention, but it will be understood that changes and alterations may be made in the exemplified structure of the drawing, within the scope of my appended claims, without departing from the principles of my invention.

Figure 1 is a side view of an archery bow embodying my invention.

Figure 2 is a view in elevation at the rear of the bow.

Figure 3 is an enlarged, broken, front face view of one of the limbs of the bow.

Figure 4 is a detail sectional view of the tubular handle, showing the shanks of the detachable or separable limbs, retained in the handle.

Figure 5 is a detail sectional view taken at right angles to the section line of Figure 4.

Figure 6 is a transverse sectional view through the tubular handle, at line 6—6 of Figure 5.

In carrying out my invention the limbs 1 and 2 of the bow are fashioned from blanks of resilient

strip steel in exact duplicates as to size and shape, and with uniformity in strength and resiliency. One and the same set of dies is employed for stamping out the blanks for all bow-limbs of the same size, thus insuring exact duplicates in a pair of limbs for the same bow.

The stamped blanks are then formed into limbs in one set of forming dies, which operation gives the correct and exact contour to the bow-limbs, except for the nocks at the bow tips. Then the partially completed limbs are passed through a small set of dies that form the nocks at the tips of the limbs.

The dies are employed in machines known as punch presses, and one blow of the press completes each operation in fashioning the limbs.

In the pressing machine a concavo-convex formation, in cross section, is imparted to the limb of the bow, and the limb is thus fashioned with a groove that varies in depth from the U-shaped shank, as 3 and 4, to the tip 5 of the limb, the maximum depth being in the shank, and the groove gradually becomes more shallow toward the tip of the limb.

As seen in Figure 1 the thickness of the grooved limb tapers down from the shank to the tip, and as seen in Figure 2 the width of the limb tapers down from the shank to the tip.

After the grooved limb is formed in the press, a second operation is performed in a suitable machine, and the two edges of the limb, adjacent the tip, are turned inwardly from opposite directions, to form the throat or nock 6, with shoulders 7, 7.

As the two limbs for each bow are thus fashioned by the two operations in the same presses, it will be apparent that the limbs may be produced in quantities, and as exact duplicates, thereby insuring uniformity of size, shape, and strength, as well as resiliency in the two limbs of the bow. The tension of the bow may be varied by varying the resiliency of the limbs, and the resiliency of the limbs is varied by varying the curvature of the grooved or concavo-convex limbs, and it will be understood that the resiliency increases with a decrease in the depth of the groove of the limb.

Thus, while the U-shaped shanks possess the required resiliency that is necessary to permit their insertion in and frictional contact with the D-shaped tubular handle, it will also be apparent that the shanks, because of their cross-sectional formation, provide a rigidity that assists in strengthening the handle portion of the bow and in maintaining the handle in inflexible position.

The tubular handle is preferably a seamless tube, of steel, open at both ends, and forms a

rigid structure, D-shaped in cross section. The handle is of comparatively light-weight metal, non-resilient, and it is of the required length to insure a proper support for the two shanks of the limbs 1 and 2. The weight of the metal employed, may of course, be varied according to the strength of the bow on which the handle is used.

The curved wall 8 of the tubular handle conforms to the curvature of the U-shaped shanks 3 and 4; the flattened side walls 9 of the shanks conform to the flat sides of the D-shaped handle; and the front edges of the shanks frictionally engage the inner face of the front flat side 9' of the handle.

In order to give an ornamental and smooth finish to the handle, and to insure a durable and suitable grip, I preferably apply an outer cover 10 thereto, which may be fashioned of leather, or other appropriate material, and in desired color.

The two shanks are inserted in the opposite open ends of the tubular handle for assembling the bow structure, and these shanks, because of their resiliency, may be slightly compressed to reduce their cross-sectional area, for ready insertion into the open ends of the handle. The shanks are then pushed into the handle until the ends of the shanks abut, as indicated in Figures 5 and 6, and if desired, a slight swell 11 may be imparted to the side walls of the limbs of the bow adjacent the shanks, to enhance the resiliency and consequent frictional engagement of the shanks with the inner faces of the tubular handle. The shanks, as they are being forced or pushed into the handle are thus placed under tension, and the entire outer faces, including the edges, of the shanks are forced into close frictional contact with the tubular handle, thereby preventing twisting or displacement of the limbs, insuring a rigid joint at the handle, and at the same time strengthening the handle.

The bow-string 12, which may be and preferably is of multistrand wire, is fashioned at its opposite ends with attaching loops 13 that are properly spliced, and as indicated these loops are slipped over the tips of the limbs and rest in the nocks 6, the shoulders 7 holding the loops in place.

In assembling the bow, the two limbs, through the medium of their shanks, are first secured in the handle, then the lower loop of the string may be slipped into the lower nock of the straight bow. With the bow, at its lower end, supported on the floor or ground, pressure is applied to the upper end of the bow for the purpose of flexing the bow. The bow is preferably flexed or bowed slightly beyond its normal curvature to facilitate slipping the upper loop of the string over the upper nock, and when pressure is released from the bow, the string is held taut with the bow in the position of Figure 1. For dismantling the bow and separating its parts, the bow is unstrung by applying pressure to flex the bow to a greater degree than in Figure 1 in order that the upper loop may be released, after which the resiliency of the limbs

restores the bow to approximately straight position, and the other end of the loosened string may readily be disengaged from its nock. One, or both, of the limbs may be pulled apart from the tubular handle, and in this operation, if necessary, the swollen parts, as at 11, of the limbs, may be compressed to facilitate withdrawal of the shanks from the tubular handle. With the parts thus separated, they may be compactly arranged for shipping, storing, or for transportation.

In the manufacture of the limbs it will be apparent that the identical duplication of parts eliminates the necessity for weighing, measuring, and testing the limbs, for it will readily be evident that the accurately stamped and pressed limbs, by the use of an appropriate machine and dies, are ready for assembling without additional steps in the manufacture of the bow. The nocks at the tips of the bow to receive the ends of the cord or string are also fashioned with the same degree of accuracy and facility as the bodies of the bow-limbs, and do not require additional finishing after they leave the press or stamping machine. After the bow-limbs and nocks have been formed as indicated, the limbs are tempered and drawn to the proper strength and toughness.

The length of the bow may be varied, and the weight may also be varied, the necessary strength for the bows being provided by the use of slightly heavier steel blanks in the manufacture of the limbs, or the strength may be increased by slightly closing the groove of the concavo-convex bow limbs. The resiliency of the limbs may be varied by varying the curvature of the grooved or concavo-convex limbs, or by varying the thickness of the metal from which the bow-limbs are made. The stronger bows of course, require the heavier metal and deeper groove, and the lighter bows the thinner metal and shallower groove.

While I have referred to the metal as pressed steel from which the limbs are manufactured, it will be understood that other suitable or appropriate metal or material may be employed, which possesses the required resiliency, lightness, and strength.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a bow, the combination with a tubular handle of D-shape in cross section, of a pair of limbs each having a shank U-shaped in cross section and rigidly retained within said handle.

2. In a separable bow for archery, the combination with a tubular handle D-shape in cross section, of a pair of limbs each having a shank U-shape in cross section and retained by frictional engagement within the handle, the rounded and flat portions of the shanks in contact with complementary portions of the handle, and the edges of the shanks in contact with the inner face of the flat front portion of the handle.

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