

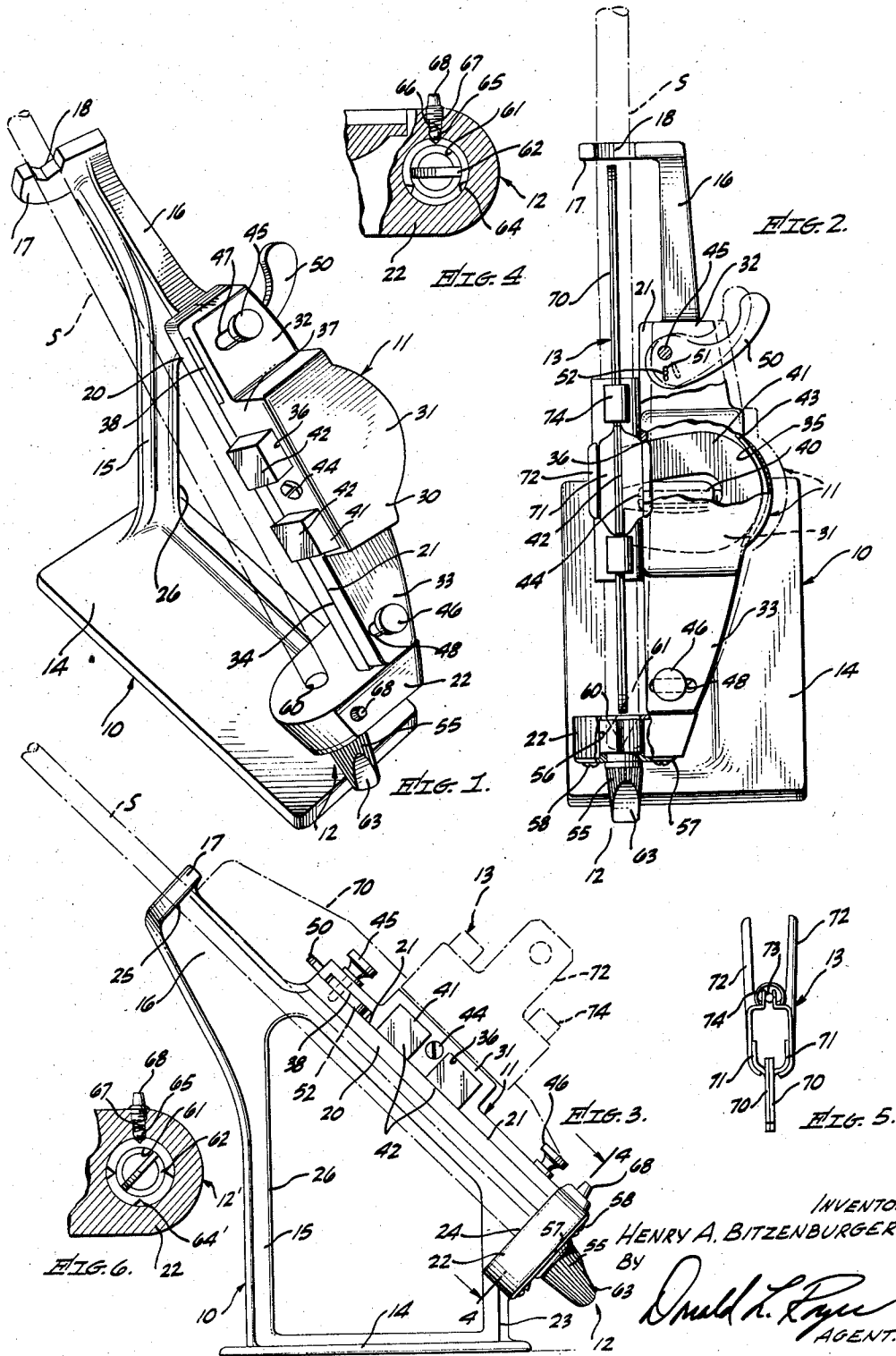
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ARROW FLETCHING JIG

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1

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ARROW FLETCHING JIG

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1 Claim. (Cl. 144—289)

The present invention relates generally to an improved arrow fletching jig and relates more particularly to a jig apparatus for use in applying fletching to arrow shafts.

In applying feathers or vanes to arrow shafts, this operation being commonly known as "fletching," it is important that the feathers be retained securely with regard to the shaft in order that proper alignment may be established while glue applied to the feather or vane is permitted to dry. Additionally, feather material is considered to be either right or left hand depending upon the side of the feather from which the material is taken. In view of this requirement, it is necessary that precise adjustability be provided with regard to the feather material support, in order to permit disposition of the feather or vane at an angle to the shaft axis and in accordance with the desired shaft rotating effect during flight thereof. Furthermore, other problems exist with regard to production conditions in mass manufacture of arrows and the application of fletching thereto. Means must be provided for rapid and accurate positioning of the shaft; alignment of the feather or vane therewith; retention of feather supporting structure and proper indexing with regard to circumferential positions of the feathers or vanes.

The present device is an improvement over the device disclosed in Bitzenburger Patent No. 2,337,080, issued December 21, 1943.

In view of the foregoing, it is one object of the present invention to provide a novel improved arrow fletching jig having means permitting rapid, efficient and accurate use thereof.

It is another object of the invention to provide a novel arrow fletching jig having means for adjustably positioning a feather or vane supporting arrangement in regard to an arrow shaft.

A further important object of the invention is to provide a novel arrow fletching jig having features of novelty permitting reliable and efficient manufacture thereof, disposition of a magnetic holding arrangement and the like.

Still another object of this invention is to provide a novel arrow fletching jig having novel means associated therewith for permitting rapid and efficient changes therein for creation of various fletching patterns on an arrow shaft.

Other and further important objects of the invention will become apparent from the disclosures in the following detailed specification, appended claims and accompanying drawing, wherein:

Figure 1 is a perspective view showing the present arrow fletching jig with the feather or vane holding means removed for clarity;

Fig. 2 is an oblique plan view of the present jig as taken along a plane parallel to the axis of the arrow shaft;

Fig. 3 is a side elevational view of the present jig;

Fig. 4 is a fragmentary sectional view of one form

2

of indexing means as taken substantially as indicated by line 4—4, Fig. 3;

Fig. 5 is an end view of the feather or vane holding means; and

Fig. 6 is a view similar to Fig. 4 showing another form of indexing means.

With reference to the drawing, the arrow fletching jig of this invention includes a frame indicated generally at 10, an adjustable alignment and supporting head 11, a shaft indexing structure 12 and a feather or vane holding clamp means 13.

The frame 10 is an integral structure formed as by casting or the like and includes a base 14 having a vertically disposed angular leg 15 extending upwardly therefrom. The upper end of the leg 15 integrally supports an arm 16, the upper outer end of which is provided with a laterally disposed tab 17 having a V-shaped notch 18 in an upper edge thereof. The frame 10 also includes an integral plate portion 20 having a planar surface 21, the surface 21 being substantially parallel to the arm 16 and disposed at an angle of approximately 45° with respect to the base portion 14. The end of the plate 20 remote from the arm 16 is integrally connected with a laterally disposed bracket portion 22 that is in turn integrally connected to the base 14 by means of a relatively short leg 23. A face 24 of the bracket 22 is disposed in spaced parallel relationship to a face 25 of the tab 17.

It is to be noted that the legs 15 and 23 and the arm 16 are provided with peripheral stiffening ribs in order to maintain sufficient strength in the frame structure and to enable light and inexpensive construction thereof, commensurate with the use requirements of the device. The plate 20, in cooperation with the legs 15 and 23 and the base 14, serve to define an opening 26 in the frame structure, the peripheral edges of which are disposed in close proximity of all of these frame portions in order that access therethrough and to structures placed in the jig may be easily permitted.

The adjustable alignment and supporting head 11 comprises an integral body portion 30 that may be formed as by casting or the like and has a raised central portion 31 and integral longitudinally extending end portions 32 and 33. The body 30 has a planar surface 34 remote from the raised portion 31 that is adapted for disposition on the surface 21 of the arm 16. Additionally, the raised portion 31 is provided with a recess 35 in the side thereof extending from the surface 34. Also, a pair of rectangular openings 36 are provided in a lateral face 37 of the body 31 and communicate with the interior of the recess 35. A lateral slot 38 is also formed in the end portion 32 and in the side thereof from the surface 34.

As shown primarily in Fig. 2, a central boss 40 is disposed integrally from the body 31 and within a central area of the recess 35. A U-shaped permanent magnet 41 is disposed within the recess 35 surrounding the boss 40 and having end portions 42 that extend through the openings 36 and outwardly from the face 37 on the body 31. A leaf spring 43 is disposed between a rearward end of the permanent magnet 41, remote from the end portions 42 and the interior surface of the recess 35. Additionally, a screw 44 threadably engages the body 31 and extends through the boss 40 for contact with an inner arcuate surface of the magnet 41 whereby to retain the magnet in position by forcing an outer curved surface thereof into contact with the spring 43. Any manufacturing variations in tolerances that may be encountered in the present device may be compensated for through use of the holding and supporting arrangement for the magnet 41 as defined by the openings 36, screw 44 and leaf spring 43. One lateral surface of the mag-

net 41 is adapted to rest upon the surface 21 of the arm 16.

The head 11 is adjustably retained with respect to the arm 16 by means of a pair of screws 45 and 46 which extend through lateral slots 47 and 48 formed respectively in the end portions 32 and 33. The screws 45 and 46 extend through the slots 47 and 48 and threadably engage the arm 16. The screw 46 establishes a pivot point for the head 11 while the screw 45 extends through an opening in a lever 50 that is disposed within confines of the slot 38. The lever 50 is provided with a slot 51 into which a pin 52 extends, the pin 52 being carried by and disposed from the end portion 32 of the head 11.

Accordingly, it may be seen that the screw 46 may be set to retain one end of the head 11 while still permitting pivotal action thereabout and upon loosening of the screw 45 and operation of the lever 50, the head 11 may be moved laterally and pivotally about the screw 46 in the manner shown by the solid and dotted lines in Fig. 2. This positioning of the head 11 serves to position the end portions 42 of the magnet 41 as desired and for a purpose to be hereinafter more fully described. After the final position of the head is established, the screw 45 may be tightened positively to retain the head and the magnet 41 in the desired position.

With reference primarily to Figs. 1, 2, 3 and 4, the bracket portion 22 of the frame structure 10 serves to support the shaft indexing structure 12. The indexing structure 12 includes an adjustable indexing member 55 that is rotatable in the recess 56 in the bracket portion 22. The member 55 is retained in position within the recess 56 by means of a plate 57 that surrounds a reduced diameter portion of the member 55 and which is attached to the bracket portion 22 by means of screws 58. An aperture 60 extends from the surface 24 of the bracket 22 and communicates with the recess 56 in co-extensive alignment therewith.

As shown in Figs. 2 and 4, the indexing member 55 is provided with a recess 61 in one end thereof in which a transverse V-shaped bar 62 is disposed. Additionally, the indexing member 55 is knurled on the outer surface thereof and has a flattened area 63. The position of the indexing member 55 is established by means of a plurality of longitudinally extending V-shaped grooves 64 in an outer periphery thereof and in the portion within the recess 56. A ball 65 is positioned in one end of a bar 66 in the bracket and is adapted for engagement with the grooves 64. The ball 65 is biased toward the groove 64 by means of a compression spring 67 that is retained in position by means of a threaded plug 68. It is to be noted that there is a cooperative relationship between the ball 65, the grooves 64, the bar 62 and the flattened area 63 and that when the bar 62 is horizontal, the flattened surface 63 will be uppermost and the ball 65 will be positioned in one of the grooves 64.

In the form of the invention shown in Fig. 4, it is to be noted that the grooves 64 are three in number and equally spaced about the periphery of the indexing member 55 for a purpose to be hereinafter more fully described. As shown in Fig. 6, a greater number of grooves 64' may be provided and properly arranged to enable different indexing patterns for the indexing member 55 and for a purpose to be hereinafter more fully described.

As shown in Figs. 2, 3 and 5, the feather or vane holding clamp means 13 includes a pair of feather clamping members 70 that have tabs 71 bent from central longitudinal areas thereof. The clamp members 70 are disposed in contacting relationship with each other and the tabs 71 are secured as by spot welding or the like to clamp levers 72. The levers 72 are pivotally disposed about a rod 73 and retain in contact with the rod by means of a pair of semicircular springs 74. Accordingly,

the springs 74 serve to bias the clamping members 70 toward contact with each other. At least the clamping members 70 are made from a paramagnetic material whereby to enable attraction thereof by the permanent magnet 41.

In operation and use of the device hereof, the supporting head 11 is positioned by loosening the screws 45 and 46 and operation of the lever 50 whereby to position the ends 42 of the permanent magnet 41 in the desired position. Thereafter, the arrow shaft S is positioned as shown by the dotted lines in Figs. 1, 2 and 3 with one end thereof containing a nock being positioned through the opening 60, with the groove therein being disposed about the bar 62 in the indexing member 55. The indexing member 55 is initially positioned with the flattened area 63 thereof in an upwardly disposed direction and with the bar 62 generally horizontally disposed. A portion of the shaft S remote from the indexing member 55 is permitted to rest in the notch 18 whereby to center the shaft and disposed the axis thereof in substantially parallel relationship to the arm 16.

With the shaft S in position as shown, the feather or vane clamping member 13 may thereafter be positioned with one of the blades 70 thereof in contact with the faces 42 of the permanent magnet 41. It may be seen that the clamping member 13 is freely movable with respect to the arrow shaft S and upon establishment of the desired position thereof relative to the shaft, the screws 45 and 46 may be permanently tightened. Normally, the clamping member 13 will be disposed at a slight lateral angle to the longitudinal axis of the shaft, the direction of this angular displacement being dependent upon whether right or left hand types of feathers are employed.

Following the alignment procedure, which may also be accomplished through use of a suitable jig mechanism, the clamping member 13 is removed from its position against the faces 42 of the permanent magnet 41 and the feather or vane is clamped between the blades 70 with a ribbed edge of the feather being exposed along the free ends of the blades. A suitable adhesive is applied to the free edge of the feather or vane and the clamping member including the feather is disposed in position for contact of this free edge with the shaft S and retained in this position by means of the effect of the permanent magnet 41 until the adhesive dries sufficiently to permit removal of the clamp from the feather or vane. This operation is thereafter repeated by rotating the indexing member 55 in order to dispose the ball 65 in the next circumferentially adjacent groove 64. Through this series of operations, the desired number of feathers or vanes may be precisely applied to the arrow shaft.

Following application of the feathers or vanes to the shaft, these may then be trimmed as by any suitable means, to the desired configuration thereof.

It may thus be seen that the improved fletching jig disclosed herein enables rapid and efficient application of feathers or vanes to arrow shafts. The provision of the opening 26 in the frame structure 10 serves to permit ready access about the shaft, non-interference with previously applied feathers or vanes and a light yet rugged construction. The specific manner for adjustably positioning the supporting member 11 as by action of the lever 50 and other openings thereof serves to provide for precise alignment of the clamping member and in turn the feather or vane relative to the shaft. Displacement of the trailing end portion of the feather or vane may also be accomplished through use of the screw 46 and the disposition thereof in the slot 48. Still further, it is to be noted that the specific construction of the holding and supporting mechanism for the permanent magnet 41 serves securely to retain this magnet in position while compensating for manufacturing tolerances and providing accurate means for enabling adjustment and/or replacement thereof. The interchangeable nature

5

of the indexing member 55 also serves as an improvement to enable application of various feather configurations to the arrow shafts.

Having thus described the invention and the present embodiment thereof, it is desired to emphasize the fact that many modifications may be resorted to in a manner limited only by a just interpretation of the following claim.

I claim:

An improved arrow fletching jig comprising, in combination: a frame structure having an integral base portion; a pair of vertically disposed supports from said base portion; an integral arm portion integrally interconnecting said supports; a planar surface on said arm portion, said arm portion and said surface being disposed at an angle to a horizontal; an aligning and supporting head adjustably disposed on said surface; a recess in said head; a U-shaped permanent magnet disposed in said recess; a leaf spring disposed between said magnet and a side of said recess, spaced ends of said magnet extending laterally from said recess and said head remote from said side of said recess; screw means carried by said head, engageable with said magnet and providing a means for urging said magnet toward said leaf spring; lateral slots in longitudinal ends of said head; thumb screws disposed through said slots and threadably engaging said arm whereby to permit independent lateral adjustment of the position of said head and coextensive faces of said magnet disposed therefrom relative to said arm and on said surface; a lever pivotally carried by one of said

6

thumb screws and disposed laterally from between said head and said surface; a pin disposed from said head and engageable with said lever remote from an axis of said one of said thumb screws to provide precise adjustment means for said head; a tab disposed laterally from one end of said arm, said tab having a V-shaped notch therein; a bracket disposed laterally from the other end of said arm; an indexing member rotatably positioned in said bracket; a removable plate retainer for said indexing member; a recess in one end of said indexing member for receiving one end of an arrow shaft; ball detent means carried by said bracket and engageable with peripheral grooves in said indexing member for circumferentially positioning said indexing member; a spring biased clamp; and a pair of planar vane engaging blades carried by said clamp, one of said blades being paramagnetic and adapted for disposition on said faces of said permanent magnet whereby to dispose an edge of a feather or vane along an arrow shaft disposed between said indexing member and said notch, the angle of said vane relative to an axis of said shaft being determined by the adjustable position of said head relative to said surface and said frame structure.

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