Dec. 5, 1967 J. WHYTE 3,356,782

METHOD OF WEIGHTING A GOLF CLUB

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Fig. 1

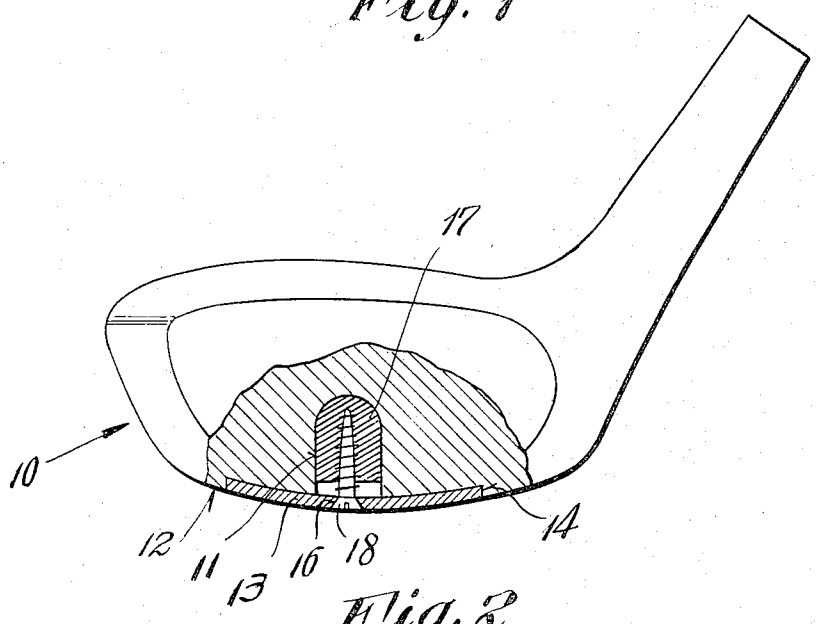
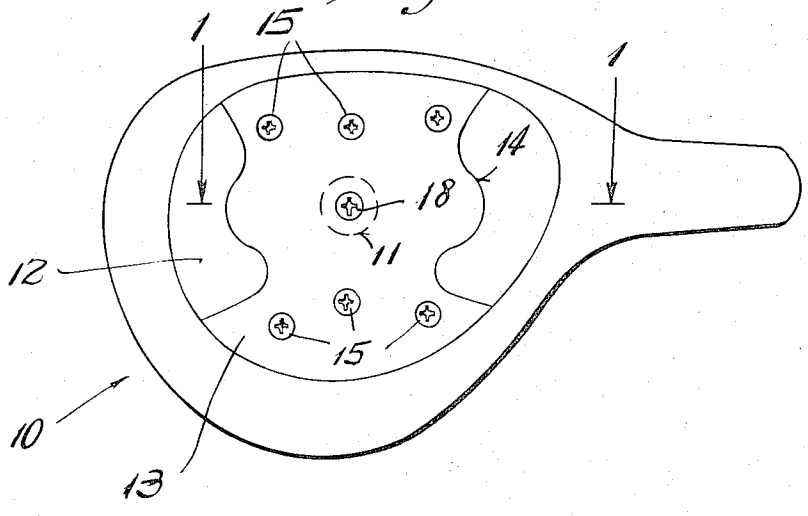


Fig. 2



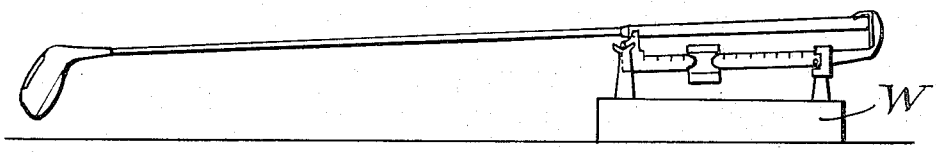
INVENTOR.
James Whyte
BY
Johnson and Kline
ATTORNEYS

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Fig. 3



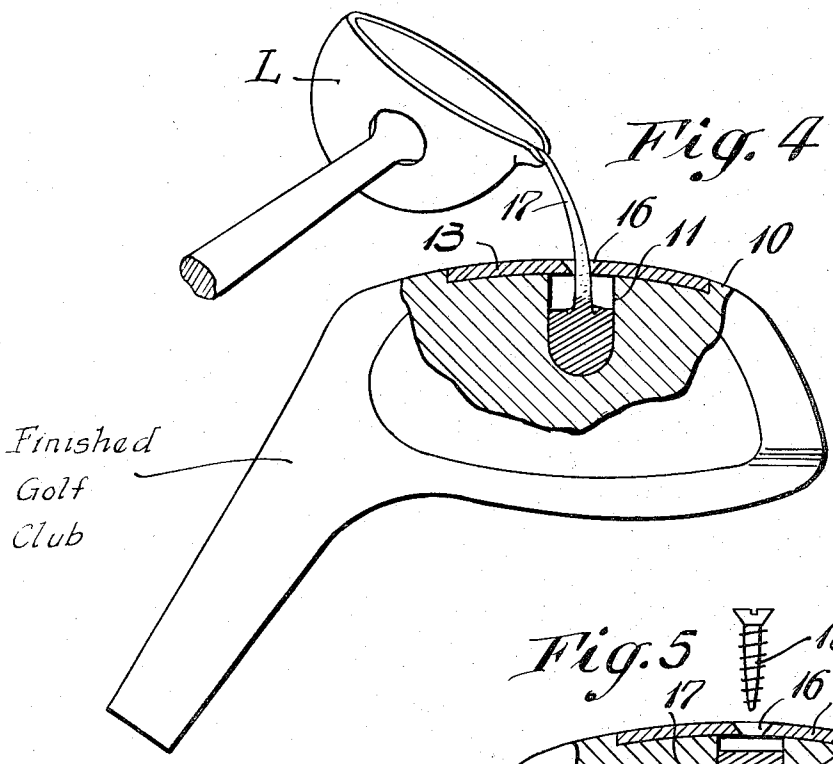


Fig. 4

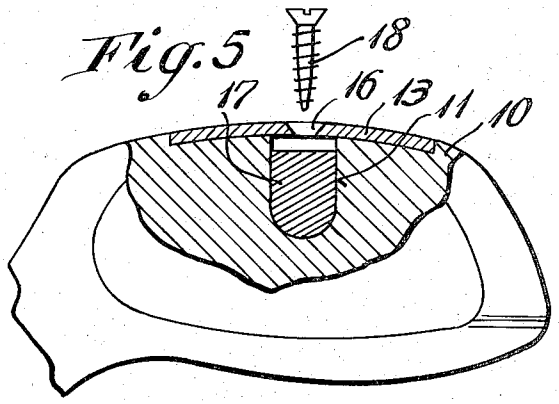


Fig. 5

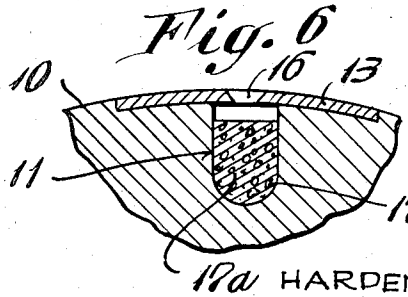


Fig. 6

17a HARDENABLE EPOXY RESIN WITH WEIGHTING PARTICLES.

INVENTOR.
James Whyte
BY
Johnson and Kline
ATTORNEYS

United States Patent Office

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METHOD OF WEIGHTING A GOLF CLUB

James Whyte, South Hadley, Mass., assignor to A. G. Spalding & Bros., Inc., Chicopee, Mass., a corporation of Delaware

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4 Claims. (Cl. 264—267)

The present invention relates to a method for weighting a golf club to produce the required balance in the club.

Heretofore, golf clubs have been provided with cavities in the bottom thereof into which preformed fixed weights have been secured and the sole plate placed in position and thereafter the heads finished with the usual finishing operations. Since the finishing operations, such as final shaping, sanding, lacquering, polishing and the like, can vary the weight of the head because they are individually controlled hand operations, they may change the overall weight of the club and alter the desired weight or balance of the club as intended to be obtained by the prior insertion of the weights. Where adjustment of the weight is desired, it has required the removal of the sole plate and the replacement of the weights therein to produce the desired balance in the club.

The present invention produces a more accurately weighted club and overcomes the above difficulties by a unique method which permits the head to be finished including the securing of the sole plate in position and thereafter the required weight of a fluid weighting material is applied to effect the desired head weight, or to adjust the balance in the club as required, without removal of the sole plate.

This is accomplished by providing a cavity in the head which opens in the outer surface of the head and is covered by a plate secured to the head and having an aperture communicating with the cavity. The head is then put through the finishing operations. Thereafter, the required weighting material is inserted in the hole in the plate which is then closed. If a matched set is required, the heads are tested after finishing and the required weighting material, preferably in the form of a hardenable weighting material in liquid form is poured through the hole or aperture in the plate to effect an accurate weighting thereof to match the clubs. A closure for the aperture is then inserted.

While the present invention is capable of being applied to golf clubs of various types, it is particularly advantageous in the weighting and balancing of wood type golf clubs in which the cavity opens in the bottom of the club and is closed by the usual sole plate on the club.

Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the accompanying drawings in which:

FIGURE 1 shows a side view with a section taken along the lines 1—1 of FIG. 2.

FIG. 2 is a bottom view of the club.

FIG. 3 shows the weighting step for the clubs.

FIG. 4 shows the step of pouring or injecting the material through the aperture into the cavity of the club.

FIG. 5 shows the step of closing the aperture by the threaded closure.

FIG. 6 is a fragmentary view of a modified form of weighting material.

While both "irons" or "woods" can be weighted, the invention is herein illustrated as applied to a wood-type head **10** which is provided with a cavity **11** substantially centrally thereof and opening on the bottom face. The cavity in the preferred form of the invention is cylindrical and terminates with its bottom wall **12** shaped with a substantially concave hemispherical surface as shown in FIG. 1. A sole plate **13** is mounted in a recess **14** in the

base to be flush with the bottom of the head, as is usual, and is secured in place by the usual recessed, headed screws **15** (FIG. 2). The sole plate overlies the cavity and has at least one countersunk aperture **16** therein communicating with the cavity **11** in the head and through which a hardenable weighting material **17** in liquid form can be poured into the cavity to harden in situ and provide the required weight for the club head. Thereafter, the aperture in the plate is closed. In the herein illustrated form of the invention the aperture **16** is closed by a screw **18** having its head disposed in the countersink thereof in the sole plate as shown in FIG. 1.

With the present invention it will be seen, therefore, that the golf club heads having the desired weight characteristics can be quickly, easily and accurately provided because the amount required to provide the desired finished head weight can be supplied after the head is finished and the sole plate fastened in position.

While the head may be made in various ways, it is at present preferred to employ the novel method of the present invention in which the head is formed with a cavity therein opening in an outer surface thereof, preferably in the bottom surface. The head is completely finished, including the mounting of the sole plate in a recess in the bottom surface to overlie the opening of the cavity to close the same. The sole plate is provided with a hole or aperture communicating with the cavity. The finished head or club, including the head, is weighed and the required amount of a hardenable weighting material in liquid form (less the weight of the screw) is injected through the aperture in the sole plate and into the cavity. The cavity is closed by a suitable closure and the weighting material is hardened. This enables the weighing of the heads to be greatly facilitated with extremely accurate results.

The method of the present invention is of particular advantage in the making of matched sets in which the clubs of the set are tested in a usual swing weighting machine W, as shown in FIG. 3, to determine the required amount of weight to be applied to the heads, which heads are finished in all respects, except the weighting operation. The amount of weight required for each head to produce a matched set of clubs is determined and the heads then placed in a fixture with the cavities facing upwardly and the required amount of weighting material is poured, as shown in FIG. 4, from a ladle or the like L through the hole in the sole plate and into the cavity to produce the required weight relationship between the heads. The screw **18** is then inserted, as shown in FIGURE 5, to close the aperture and the weighting material is permitted to harden. Should further adjustment of the heads be required, it is possible to remove the screw and supply additional weighting material to the cavity to correct any deficiencies in the weight therein, after which the screw is again inserted to seal off the cavity.

The present invention is also of great advantage should the making of the heads be automated since it provides a means which can be operated automatically to provide any required additional weight as may be determined in the automated line to produce an accurate weighting of the finished heads.

The weighting material **17** in the head must be a solid structure; therefore, it can be of any suitable hardenable material which can be deposited in fluid form. As shown in FIG. 6, one such material can be a self-hardening resin **17***a* having weighting material dispersed therein, such as an epoxy resin having particles **17***b* of lead, bronze or brass therein, with the resin forming a hardenable binder therefor.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. A method of weighting a golf club which has had all finishing operations performed thereon, said club including a club head having a cavity therein, said cavity being closed by an overlying member except for an aperture therein communicating with said cavity, said cavity being devoid of any weighting material therein, the steps of feeding a hardenable weighting material in fluid form through said aperture into said cavity in the head to provide the required weight in the head, closing said aperture and solidifying the weighting material.

2. A method of weighting a golf club which has had all finishing operations performed thereon, said club having a club head having a cavity opening in the bottom thereof closed by a portion of said head except for an aperture therein communicating with said cavity, the steps of injecting a self-hardening weighting material in fluid form through said aperture into said cavity in the head to provide the required weight in the head, inserting a closing means into said aperture to seal the cavity with said closing means extending into said weighting material and solidifying the weighting material.

3. A method of weighting a wood-type golf club which has had all finishing operations performed thereon, said club including a wood-type head having a cavity therein opening in the bottom thereof, said cavity being closed by an overlying sole plate except for an aperture therein communicating with said cavity, and the diameter of said aperture being less than the diameter of said cavity, the steps of determining the amount of weighting material required to produce the desired head weight, feeding

said required amount of weighting material in fluid form through said aperture into said cavity in the head, inserting a threaded closing means into said aperture to close said aperture and seal the cavity, and solidifying the weighting material.

4. A method of adjusting the weight of a golf club which has had all finishing operations performed thereon, said club having a head provided with a cavity in the bottom thereof closed by a sole plate except for an aperture therein communicating with said cavity, the diameter of said aperture being less than the diameter of said cavity, the steps of testing the club on a swing weight device to determine the weight to be added to the head to balance the club, adding the required amount of weighting material in fluid form into said cavity through said aperture in the sole plate to balance the club, closing the aperture and solidifying the weighting material.

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ANTON O. OECHSLE, *Primary Examiner.*

DELBERT B. LOWE, F. BARRY SHAY, *Examiners.*

G. J. MARLO, *Assistant Examiner.*