Dec. 20, 1955 T. O. BRANDON 2,727,384

ATHLETIC IMPLEMENT MATCHING DEVICE

Filed July 9, 1952 2 Sheets-Sheet 1

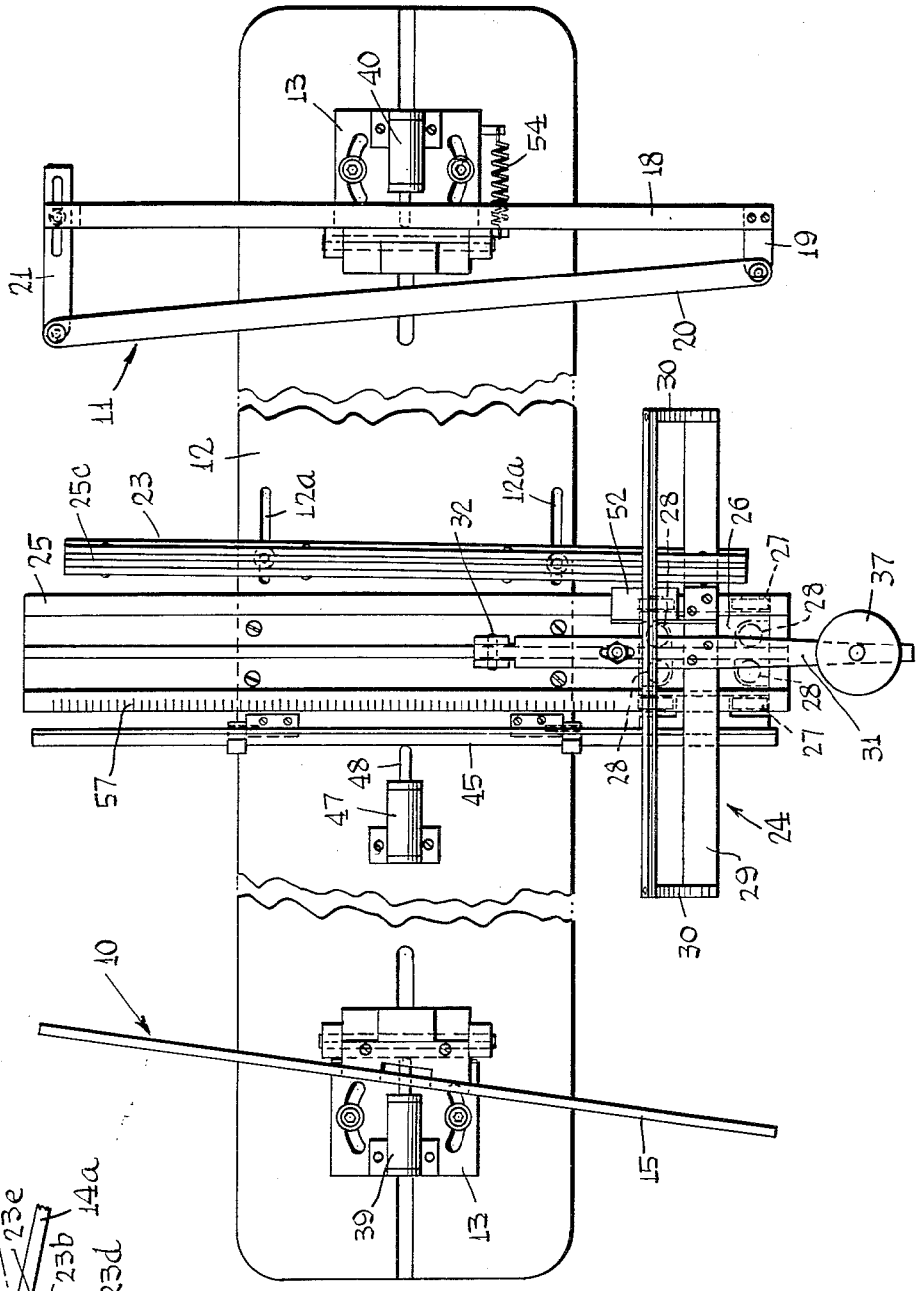

Fig. 1

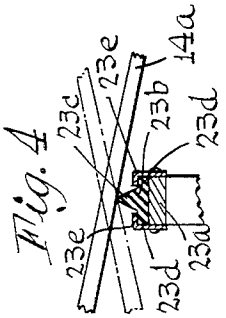

Fig. 4

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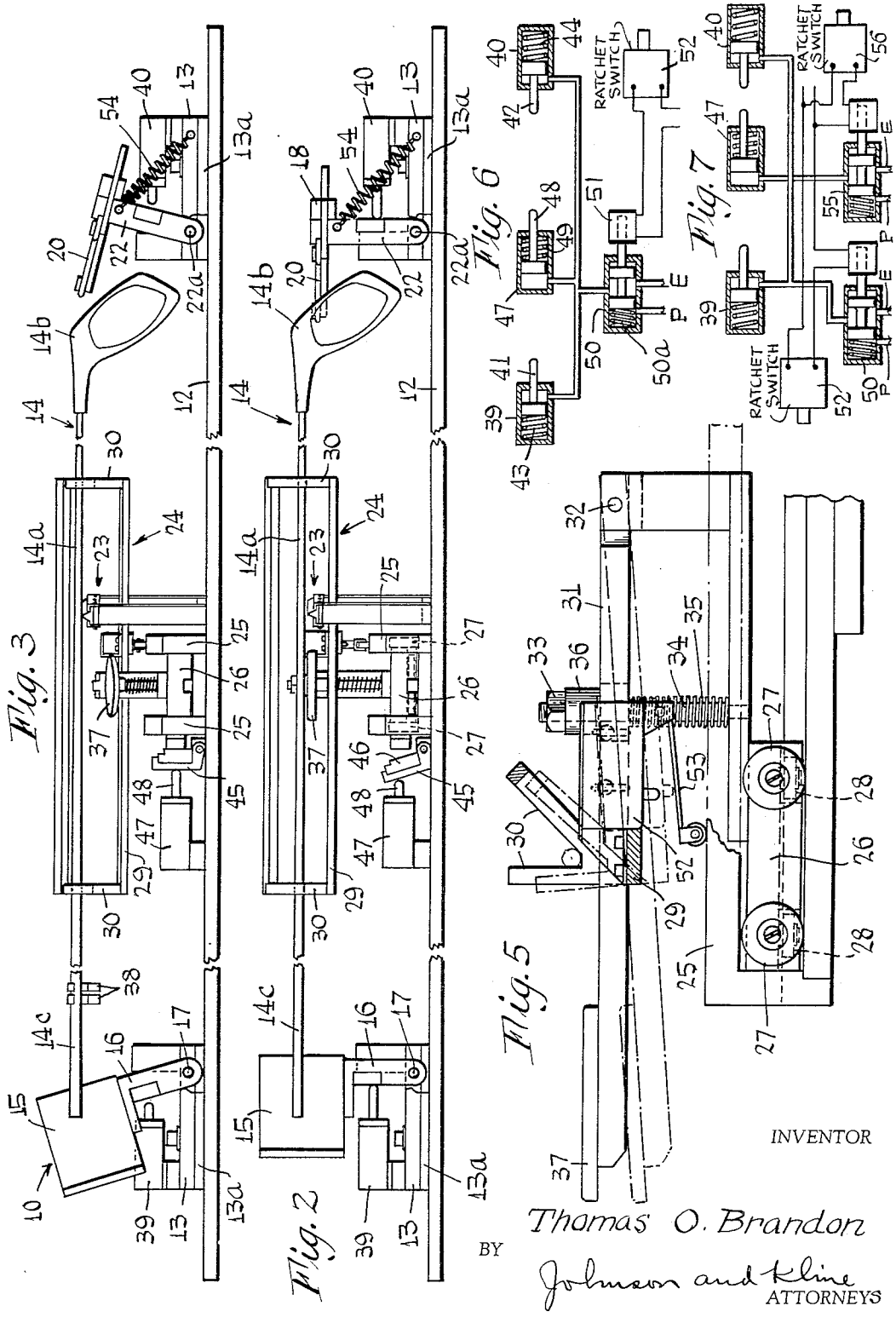

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United States Patent Office

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ATHLETIC IMPLEMENT MATCHING DEVICE

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14 Claims. (Cl. 73—65)

The present invention relates to a device for providing matched athletic implements, particularly golf clubs, having a predetermined feel and performance in play.

It has been the practice to provide matched sets of golf clubs in which the clubs of varying length and weight are selected so that they all have substantially the same feel in use. One method of accomplishing this result has been by supporting the golf club at the grip end and measuring the "swinging" weight of the club and then selecting clubs with predetermined swinging characteristics to form the matched set. This is a tedious job and at best an inaccurate method of matching.

I have discovered that by providing a set of clubs having predetermined correlated centers of gravity I am able to provide an accurately matched set in which all of the clubs have substantially the same feel and play characteristics when in use.

It is an object of the present invention to provide a device whereby the matching of sets or individual clubs of sets may be carried out expeditiously and accurately.

In carrying out this object of the invention, I provide a means for engaging the ends of the club to locate it in a predetermined position on the device and also provide a balancing edge on the device which is located with respect to the end engaging members so as to engage the club held thereby at the calculated center of gravity of the club for that length of club. In the preferred form of the invention the end engaging members are disposed in a horizontal position and the balancing edge is so arranged with relation to the end engaging members that it lies along a line which includes the calculated centers of gravity of the clubs of various lengths. Thus by inserting the club in the locating means and then causing the club to be supported by the balancing edge, the weight distribution of the club can be corrected to produce a balanced relation on the balancing edge and accurate and uniformly matched clubs can be readily obtained.

The present invention is not only useful in producing matched sets of clubs but is also useful in duplicating clubs of the set.

Another object of the invention is in providing a quick means for determining the length of clubs positioned therein when such information alone is required.

While the present invention has been described as a means for matching golf clubs, it is useful for providing matched athletic implements of other types, such as tennis rackets, badminton rackets and in fact any similar type of athletic implement wherein a predetermined center of gravity is to be maintained in the implement.

A feature of the present invention is found in the novel balancing edge in which the golf club shaft or other athletic implement is supported thereon through a wide range of unbalance without slipping.

Another feature of the invention resides in a novel club supporting means for quickly and accurately positioning the club between the end engaging members and the control therefor.

A further feature of the invention includes novel control means for regulating the movement of the end engaging members and brake for the carriage in order to expedite operation of the device.

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

Figure 1 shows a plan view of the device.

Fig. 2 shows a side view of the device with the club supported on the carriage.

Fig. 3 is a similar view with the club transferred to the balancing edge.

Fig. 4 is a detailed fragmentary view of the balancing edge with the club positioned thereon.

Fig. 5 is a detailed view partly in section of the carriage mechanism.

Fig. 6 is a diagrammatic view of the control for the fluid operating cylinders for the end engaging and the brake members.

Fig. 7 is a view of another form of control.

While the present invention is useful for providing matched athletic implements of various types, it is herein illustrated as being applied to the matching of golf clubs.

As shown in the drawing, club locating means are provided and comprise end engaging members **10** and **11** which are angularly related so as to receive between them golf clubs of varying lengths. While the end engaging members may be positioned in a vertical plane, in the herein illustrated form of the invention they are mounted in spaced relation on base **12** to lie in a substantially horizontal plane. Each of the end engaging members is carried by a base **13** which is angularly adjustable on a plate **13***a* mounted for longitudinal adjustment on the base **12**. The golf club **14** has a shaft **14***a* provided with a head **14***b* at one end and a grip end **14***c* at the other end. The grip engaging end member comprises an elongate transversely extending plate **15** angularly mounted on a carrier arm **16**. The carrier arm **16** is pivotally mounted at **17** on the base **13** for movement about an axis transverse to the axis of the golf club so that the plate **15** can be moved about the pivot into and out of an end engaging position, as shown in Figs. 2 and 3 respectively.

The head engaging member comprises a transverse member **18** having a bracket **19** at one end to which is pivoted a narrow head engaging bar **20**. The other end of the head engaging bar is connected to a slotted link **21** adjustably carried by the member **18** so that the head engaging bar may be angularly adjusted with respect to the transverse member. It will be noted in Fig. 2 that the head engaging bar contacts the head in substantially a line contact at a point slightly below the connection of the shaft to the head so as to properly position the club without introducing any undesirable turning action on the club head as it is moved into located position between the end engaging members.

The transverse member **18** is mounted on the carrier arm **22** pivotally mounted at **22***a* on the base **13** in a manner similar to arm **16**. The base **13** is angularly adjusted on a plate **13***a* which is longitudinally adjustable on the base. It will thus be seen that the end members can be adjusted toward one another and angularly with respect to one another so as to receive any desired range of lengths of golf club shafts therebetween.

Adjustably mounted on the base **12** to lie along the calculated centers of gravity of the clubs to be positioned between the end engaging members is a balancing edge **23**. While the balancing edge may have a curved, stepped or other longitudinal configuration, as determined by the calculated centers of gravity for the various length clubs to be matched, it is herein illustrated as a straight member. It is mounted on the base **12** by means of elongate slots **12***a* so that it has a predetermined relation with the end engaging members and lies along and contains the

calculated centers of gravity for all of the clubs adapted to be positioned between the end members.

In order to facilitate the positioning of the club between the end engaging members, the present invention provides a club support **24** which holds the club in horizontal position and moves transversely of the base to carry the club into engagement with the end engaging members. This is accomplished in the illustrated form of the invention by providing an elongate track **25** secured to the base intermediate the end engaging members and having a carriage **26** slidably mounted thereon by rollers 27 and held against lateral movement by rollers **28** for easy transverse manipulation.

The club is supported on the carriage by an elongate club supporting cradle **29** provided with notched or Y-shaped members **30** adjacent its ends to engage the shaft **14***a* of the club at spaced positions so as to normally support the club in a horizontal position above the balancing edge during movement of the carriage as shown in Fig. 2. While the balancing edge may be moved upwardly above the club supporting cradle and into engagement with the shaft of the club so that the club will be freely supported thereon at the calculated center of gravity of the club, in the illustrated form of the invention the club supporting means is moved below the balancing edge. This is accomplished by the cradle being mounted on a transverse arm **31** pivoted at **32** at the rear end thereof to the carriage and being normally urged into its uppermost position and in engagement with a stop nut **33** threaded on a post **34** on the carriage by a spring **35** surrounding the post. A resilient buffer **36** is interposed between the arm and the stop nut to absorb any shock incident to movement of the carriage to its upper position. The forward end of the transverse arm has a handpiece **37** thereon whereby the cradle may be manipulated to move it to its lower position below the balancing edge and transfer the club to the balancing edge to be freely supported thereby. As shown in Fig. 4, the novel balancing edge employed herein comprises a base **23***a* having on its upper edge a rubber or the like friction member **23***b* having a cross-section shown in Fig. 4 providing a projecting central portion **23***c* and lateral flanges **23***d* which are secured to the end of the base member by angle members **23***e*. The upper edge of the projecting member is provided with a slight radius and the surface of the balanced edge being of rubber or other similar material provides sufficient friction to hold the club shaft against slipping thereon throughout a wide range of angular positions thereon, as indicated by the solid line and dash line positions of Fig. 4, while the club is supported thereby.

After the club has been transferred to the balancing edge, its angular position is noted and the weight distribution of the club is then adjusted to provide a balanced relation. This is accomplished by either observing the angular position of the club on the balancing edge and using this angular relation to determine the weight correction or by applying small weights **38** to either end of the club as shown in Fig. 3 to bring it into a balanced relation on the balancing edge and thereafter make adjustment of the weights of the club in accordance with the added weights.

In order to free the club for balancing on the balancing edge, it is at present preferred to move the end engaging members out of engaging position and also to provide a brake for the carriage to prevent displacement of the club as the end engaging members move out of contact therewith. While this may be accomplished by the end engaging means and the brake means being actuated by any suitable mechanical or electrical means, they are herein illustrated as being controlled by fluid operated means having electrically controlled actuators therefor. In the present preferred form of the invention the bases **13** on the end engaging members are provided with fluid cylinders **39, 40** which, as shown in Fig. 6, are provided with spring pressed piston actuated plungers **41, 42** normally urged outwardly by springs **43, 44** to a position shown in Fig. 2 to engage the end engaging members and position them in operative position to receive the club.

The brake member comprises an elongate pivotally mounted member **45** positioned to extend along the track and has a brake block **46** to engage the side of the carriage to hold it against movement on the track. The brake mechanism is normally held in off position by gravity or other suitable means. The brake applying means comprises a fluid cylinder **47** having a piston actuated plunger **48** which is normally held in retracted position by spring **49**. In the form of the control illustrated in Fig. 6 the cylinders are all connected to a solenoid operated valve **50** for simultaneous operation. The solenoid **51** is connected to a ratchet switch **52** of the usual two pole, two position type carried by the arm **31** and actuated by the member **53** carried by the carriage when the arm **31** and the cradle thereon is moved to its lower position to transfer the club to the balancing edge. The initial movement of the arm actuates the ratchet switch to closed circuit position which energizes the solenoid **51** and moves the valve against spring **50***a*, which normally holds the valve to connect the cylinders to the exhaust port E, to a position to connect the cylinders to pressure port P to each one of the cylinders and to retract the end engaging plungers **41, 42** and project the brake plunger **48**. This simultaneously permits the end engaging means to move to retracted position and applies the brake to the positioned carriage.

The end engaging means may be moved to retracted position by any suitable means. In the illustrated form of the invention, for example, the head engaging end is retracted by a spring **54** connected to the head end and the grip end engaging member is retracted by gravity due to the distribution of the weight of the end engaging member.

Since the brake means is moved to operative position upon the energization of the cylinder and the end engaging members moved to release position by separate means after actuation of the cylinders, there will be a sufficient time lag to insure the brake being applied before the end engaging members move out of contact with the club to securely hold the club in proper position. The end engaging members and the brake member maintain these positions until the transverse arm **31** on the carriage is depressed again to step the ratchet switch **52** to open circuit position, whereupon the end engaging members and brake assume the positions shown in Fig. 2.

If it is desired to provide separate controls for the brake and end engaging members, it may be accomplished by a control circuit as shown in Fig. 7 wherein there is provided a separate solenoid valve **55** and a separately manually actuated ratchet switch **56** of the type described above for controlling the brake cylinder. This permits the operator to actuate switch **56** and apply the brake to the carriage prior to the engagement of the arm **31** and its movement to actuate the switch **52** and valve **50** to release the end engaging members for movement into retracted position.

Thus it will be seen that the device of the present invention provides a means whereby matched sets of clubs can be quickly and accurately obtained or duplicates of individual clubs may be obtained with a minimum of error.

Furthermore, if it is merely desired to segregate clubs with respect to the length of the club, this may be readily accomplished by providing a scale **57** on the track and utilizing the position of the carriage with respect to the scale to indicate the length of the club positioned between the club locating means.

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. Apparatus for checking the center of gravity of

athletic implements of the type having a head and a handle portion, comprising spaced angularly related end engaging members adapted to engage the ends of an athletic implement placed therebetween and locate the same; a fulcrum means disposed between the end engaging members at a position to support the implement at the calculated center of gravity for said implement; means for supporting the implement against tilting movement during positioning thereof between the end engaging members; and means for withdrawing the last named means and supporting the located implement by the fulcrum means to be freely tiltable thereon whereupon compensating weights may be applied to said implement so as to produce a predetermined balanced relation on the fulcrum means with respect to the calculated center of gravity thereof.

2. A device for checking the center of gravity of golf clubs having shafts, heads and predetermined correlated centers of gravity comprising club locating means to engage and locate a golf club placed in contact therewith; a shaft engaging balancing edge disposed at a predetermined position with respect to said club locating means to engage said shaft at the calculated center of gravity of the club; and means for moving the located club into engagement with the balancing edge to be freely supported and balanced thereby whereupon compensating weights may be applied to said club so as to produce a balanced condition of said club on said balancing edge, said balancing edge having a slip resistant surface for holding said shaft against slippage thereon through a substantial range of unbalance.

3. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; locating means on the base to receive and locate in predetermined position golf clubs of varying length; balancing edge means positioned on the base with respect to said locating means so as to lie along a line including the calculated center of gravity for the varying club lengths located by said locating means; means supporting a club for movement into engagement with said locating means; and means for transferring the located club from the supporting means to the balancing edge to be freely supported by the balancing edge.

4. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means thereon to receive and carry a club transversely of the base and into engagement with the end engaging means; and means for relatively moving the club supporting means or the balancing edge to transfer the club to the balancing edge to be freely supported thereby.

5. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; means mounting said end engaging members on the base for movement to and from end engaging position; means acting on said members to move the members to said positions; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a transversely movable carriage mounted on said base between said end engaging members and having shaft engaging club supporting means thereon to receive and carry a club transversely of the base and into engagement with the end engaging means; and means transferring the club from the club supporting means to the balancing edge to support the shaft freely thereby.

6. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means thereon to receive and carry a club transversely of the base and into engagement with the end engaging means; means moving the end engaging members out of engagement with the supported club; and means for relatively moving the club supporting means or the balancing edge to bring the club into position to be freely supported by the balancing edge whereupon compensating weights may be applied to said club so as to produce a balanced condition of said club on said balancing edge.

7. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means thereon to receive and carry a club transversely of the base and position the club in engagement with the end engaging means; means holding said carriage in the last named position; and means for relatively moving the club supporting means or the balancing edge to bring the club into position to be freely supported by the balancing edge whereupon compensating weights may be applied to said club so as to produce a balanced condition of said club on said balancing edge.

8. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means thereon to receive and carry a club transversely of the base and position the club in engagement with the end engaging means; means moving the end engaging members out of engagement with the supported club; means holding said

carriage in the last named position; and means for relatively moving the club supporting means or the balancing edge to bring the club into position to be freely supported by the balancing edge whereupon compensating weights may be applied to said club so as to produce a balanced condition of said club on said balancing edge.

9. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members angularly disposed with relation to one another to engage the grip end and head end of golf clubs of varying lengths and position the clubs therebetween, the head end engaging member having a contacting member disposed to contact the bottom surface of the golf head at a point below the shaft connection to the head; means mounting said end engaging members on the base for movement to and from end engaging position; means acting on said members to move the members to said positions; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a transversely movable carriage mounted on said base between said end engaging members and having shaft engaging means thereon to receive and carry the club transversely of the base and into engagement with the end engaging means; and means transferring the club from the carriage to the balancing edge to be freely supported by the balancing edge.

10. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end engaging members and located with respect to said members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; transversely extending track means mounted on the base between said end engaging members; and carriage means mounted on the track means for movement therealong, said carriage having an elongate club supporting cradle thereon provided with Y shaped members to engage the shaft of the club and support the club in a horizontal position during movement into engagement with the end engaging means, said cradle being mounted on a transverse arm pivoted at one end to the carriage and having spring means urging the cradle upwardly to normally position the club above the balancing edge and movable to a position lower than the balancing edge wherein the club is transferred to and freely supported by the balancing edge.

11. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means thereon to receive and carry a club transversely of the base and position the club in engagement with the end engaging means; means moving the end engaging members out of engagement with the supported club; means holding said carriage in the last named position; means for relatively moving the club supporting means or the balancing edge to transfer the club to the balancing edge to be freely supported thereby; electrically actuated fluid control means for controlling the means for moving the end engaging members; and separate electrically actuated fluid control means for controlling the holding means for the carriage.

12. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means movably mounted thereon to receive and carry a club transversely of the base and position the club in engagement with the end engaging means; means moving the end engaging members out of engagement with the supported club, said club supporting means being normally urged to a position above the balancing edge and movable to a position below the balancing edge to transfer the club to said edge to be freely supported thereby; and means controlled as an incident to movement of the club supporting means from normal position to actuate the means moving the end engaging members out of engaging position.

13. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge positioned between the end members and located with respect to said members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; a carriage positioned between said end engaging members; means mounting the carriage for transverse movement on the base, said carriage having club supporting means movably mounted thereon to receive and carry a club transversely of the base and position the club in engagement with the end engaging means; means moving the end engaging members out of engagement with the supported club; means holding said carriage in the last named position, said club supporting means being normally urged to a position above the balancing edge and movable to a position below the balancing edge to transfer the club to said edge to be freely supported thereby; and means controlled as an incident to movement of the club supporting means from normal position to actuate the means moving the end engaging members out of engaging position and the carriage holding means into holding relation.

14. A device for checking the centers of gravity of matched golf clubs having predetermined correlated centers of gravity comprising an elongate base; spaced transversely extending end engaging members longitudinally and angularly adjustably mounted on the base and angularly disposed with relation to one another to receive and position therebetween golf clubs of varying length; a transversely extending balancing edge adjustably mounted on the base between the end members and located with respect to said end members so as to lie along a line including the calculated center of gravity for the varying club lengths positioned thereover by the end engaging members; transversely extending track means positioned between said end engaging members; a carriage mounted on the track means for movement therealong

to position the club in engagement with said end engaging members, said carriage having a shaft engaging cradle thereon to receive and carry a club in a horizontal position into engagement with the end engaging means, said cradle being pivotally mounted on the carriage and having resilient means connected thereto to normally urge the cradle to position the club above the balancing edge and being manually movable to a position below the balancing edge to move the shaft of the club into engagement with said balancing edge to be freely supported thereby whereupon compensating weights may be applied to said club so as to produce a balanced condition of said club on said balancing edge, said balancing edge having a slip resistant surface for holding said shaft against slippage thereon through a substantial range of unbalance; means for moving the end engaging members out of engagement with the supported club; brake means acting

on the carriage for holding said carriage in the last named position; and means actuating the means for moving the end engaging members to free the club from engagement thereby, said means including fluid operating means and electrical actuating means therefor actuated incident to the movement of the cradle to the lower position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,374,127	Weibull	Apr. 5, 1921
2,055,274	Avery	Sept. 22, 1936
2,307,877	Chapman	Jan. 12, 1943
2,595,717	Smith	May 6, 1952

FOREIGN PATENTS

381,729	Great Britain	Oct. 13, 1932