beating against the dyke which, when the current is reversed, could not be pushed back thereby. A mud-collecting conduit 60 leads from the well 33 to the bottom of the space 61 in front of the dyke 29 from whence it is raised by a chain bucket arrangement 62 to the top of the dyke, where it is deposited in suitable transporting devices. Cut-waters W (Fig. 3) prolong the separations between the turbines and are fitted with slideways which render it possible to place dams if repairs are necessary. The walls 26 are provided with suitable sluices 63 controlled by sluice valves which may be operated from the power plant proper. In Fig. 2 the dotted lines O indicate the level of the lowest low tides of the locality. The line S indicates the level of the head of spring tides. The line Q indicates that of the highest tides of the locality.

In operation, when the tide is rising and has reached a predetermined height, the reservoir P being empty, there will be sufficient operating head level between the tide and said reservoir, and upon the opening of the gates 49, 50, 54 and the gates 55 leading to the said reservoir P, water will flow through the turbines, causing the same to rotate, from thence the water will flow through the passageway 44 and the corridor 40 to the reservoir P, the gates 51 and 53 being closed. The flow through the turbines to the reservoir P will continue until the tide has risen to its maximum height; in the meantime the gates 55 of the sluices 48 leading to the reservoir R being closed. The tide at this point is much higher than the level of the water in the reservoir R and also higher than the level in the reservoir P. At this point the sluice gates 55 leading from the corridor to the reservoir P are closed and those connecting it directly with the sea are opened; at the same time the sluice gates controlling the flow of water between the corridor and the reservoir R are opened and water will therefore freely flow into both the reservoirs P and R (to P from the sea and to R from the corridor), completing the filling of the reservoir P in the first part of the second phase to a level slightly lower than the maximum height of the tide.

During this second phase the larger reservoir R fills from its initial level to a predetermined height above its initial level. At the end of this phase the sluice gates 55 leading to the reservoir R are closed and the sluice gates 63 connecting the said reservoir R directly with the sea are opened. At this point the tide level will be greater than the level in the larger reservoir, and, as a consequence, water will flow through the sluice gates 63 into the large reservoir R completely filling the same in the third phase. At the beginning of this third phase the sluice gates 55 connecting the reservoir P with the corridor 40 are again opened and the level in the reservoir P will be higher than the level of the tide, and, when the sluice valves from the reservoir P are opened, water will flow from the reservoir P and pass through and operate the turbine in a reverse direction from that described above in connection with the first phase of the cycle, the power being taken off by suitable compensators. The flow from the reservoir P will continue through the turbine throughout the third phase of operation, when the sluice gate 55 connecting the reservoir P with the corridor 40 are again closed and the sluice valve 63 connecting the said reservoir with the sea is opened, in order to completely empty the reservoir P. At the beginning of the fourth phase the level of water in the larger reservoir R will be higher than that of the tide. The sluice gates 55 controlling the passages from the reservoir R are opened to the corridor 40 at the beginning of this phase and water flows from the reservoir R through the turbines, and at the beginning of this phase the reservoir P completely empties itself through the sluice valves 63 leading directly to the sea. At the end of the fourth phase the cycle of operations as set forth above will be repeated, the sluice valves 63 connecting the reservoir R with the sea being opened to permit said reservoir to quickly empty itself to its original level during the first phase of the succeeding cycle, the gates 55 leading to reservoir P being opened.

As will be noted from Figs. 4 and 5 of the drawings, the turbines are preferably arranged in groups of four, and while the first group is supplied through the passages 38, the water may be caused to flow through successive groups by a suitable arrangement of the floor or partitions 35, which as shown in Fig. 5 slant upwardly from the underground conduits 47, the passages between the underground conduits and the adjacent compensation chambers 34 being controlled by gates 64. It will be readily seen that by this arrangement as many of the turbines may be thrown into operation as is desired, inasmuch as when the turbines are grouped in this manner each successive group can be caused to be traversed in series by the water, the groups being capable of being separated by the gates 64 and the water directed to the gallery 40 through the passageways 46. Assuming the water to be coming from the sea, it will pass into the first group of turbines through the conduits 41 and then, the gates 51 and 54 being closed, it will pass into the conduits 47 rising toward the conduit 41 of the next succeeding group and after going through the turbines of this group, passing through the conduits 44 thereof and so on for as many groups as desired, whereupon it flows through the pas-

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GOLF-BALL RETRIEVER.

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The present invention relates to a device which may be used for retrieving golf balls that have dropped or rolled into ditches or water hazards and located so remote from the edge that the normal reach of a person is not sufficient to enable recovery of the balls without the aid of some device.

The principal objects of the invention are to provide golf ball retrievers which may be quickly brought into use from collapsed or distended conditions to great lengths so as to enable recovery even tho the balls may have dropped or floated far from the edge of the water hazard; and to provide retrievers that are light in weight, inexpensive to manufacture, and of a size when collapsed or distended that they may be easily and conveniently carried about.

Another object of the invention is to provide retrievers, the telescopic main body portions of which may be made of tubular sections, each substantially uniform in interior and exterior diameter thruout the major portion of its length and suitable stops to limit the movement of the sections one relative to another and thereby avoid the use of gradually tapering tubular members which are more costly to produce than sections of "stock" tubing.

Other objects and advantages of the invention will appear in the following detailed description, taken in connection with the accompanying drawing, forming a part of this specification, and in which drawing:

Figure 1 is a view partly in elevation, and partly in central longitudinal section thru the golf ball retriever, portions of the main body portion being broken away and removed to condense the view, the device being shown in a collapsed condition.

Figure 2 is a view similar to Figure 1, but on a slightly smaller scale, and showing the device extended for use.

Figure 3 is a fragmentary perspective view of sections of the telescopic main body portion, and showing particularly a stop or bumper for limiting the inward movement of sections.

Figure 4 is a view partly in plan and partly in central longitudinal section thru the outer end portion of the retriever, and showing more particularly the preferred manner of detachably connecting the head to the main body portion.

Figure 5 is an enlarged detail view partly in plan and partly in section showing a shank portion of the head about to be forced into a section of the main body portion.

Figure 6 is an enlarged cross sectional view on the line 6—6 of Figure 4.

Figure 7 is a perspective view showing a person using the retriever.

In the drawing, wherein similar characters refer to similar parts thruout the views, A designates a telescopic main body portion, in the example shown including sections B, C and D; E a suitable handle; and F a head, which, in the example shown, includes a frame G and net H.

Referring first to the telescopic main body portion, each section thereof is preferably of uniform diameter thruout the major portion of its length thus enabling the sections to be cut from "stock" material of the desired gauge, such as steel tubing. In the example shown, the section B has, at its inner end, lugs 8, and at its outer end is inturned, as at 9, to provide a shoulder 10 for purposes to be subsequently set forth. The section B may, by way of example, be of a size five-eighths inch steel tubing, number twenty-two gauge, say forty-two inches long. The section C which, in the example shown, is the intermediate section has its outer end portion inturned as at 11, to provide a shoulder 12, and at its inner end may be flared outwardly to provide a shoulder 13. This intermediate section C may, by way of example, be of one-half inch steel tubing, number twenty-two gauge, approximately forty-four inches long. The section D has its outer end open, as at 14 and at its inner end is flared outwardly to provide a shoulder 15. This section D may be of three-eighths inch steel tubing, number twenty-two gauge, approximately forty-five inches long. These dimensions given, are merely by way of example, but provide a golf ball retriever which may be conveniently carried in the golf bag, when in a collapsed condition, and yet enables the device to be extended for reaching golf balls remote from the edge of the water hazard.

Intermediate the shoulders 10 and 13 an enlargement 16 is provided, which may be a short length of number twenty-two gauge steel tubing, nine-sixteenths inch in diameter and approximately two inches long, while intermediate the shoulders 12 and 15 a similar enlargement 17 is provided which, in the example shown, may be of seven-sixteenths inch steel tubing two inches long.

in this case and a portion only of the turbines running under high head and actuating at a reduced velocity, the alternators with the assistance of change speed mechanism.

The preferred form of means for maintaining the height of fall between the upstream and downstream levels constant is adjustable or regulatable in accordance with the requirements of the cycle, this means or regulating device forming a very advantageous component of the plant and will be hereinafter described to illustrate one means or device for accomplishing this purpose.

The invention consists in the construction and arrangement of the several parts which will be more fully hereinafter described and claimed.

In the drawings:

Fig. 1 is a horizontal sectional view, showing a gallery type plant embodying the features of the invention;

Fig. 2 is an enlarged section on the line 2—2, Fig. 1, showing the relation of the dykes and sluices to the turbine in the power plant proper;

Fig. 3 is an enlarged plan view of a portion of the plant shown by Figs. 1 and 2;

Fig. 4 is a longitudinal section of the plant on an enlarged scale taken on the line 4—4, Fig. 2, looking in the direction of the arrows;

Fig. 5 is a similar enlarged longitudinal section on the line 5—5, Fig. 2;

Fig. 6 is a plan view of the alternator on an enlarged scale showing the relation thereof to one of the turbines and the differential gears of a change speed mechanism;

Fig. 7 diagrammatically illustrates in section and elevation one form of automatic adjusting means by which the height of fall or head of water may be adjusted and automatically maintained constant;

Fig. 8 is a transverse sectional view, showing a modified arrangement of the dykes and water passages relatively thereto and the turbines;

Fig. 9 is a plan view of a portion of the modified plant as shown by Fig. 8.

Referring to the drawings in detail by reference numerals and describing first the embodiment of my invention as illustrated in Figs. 1 to 5, inclusive; "A" designates the sea and "B" headlands or buttresses on either side of the mouth of an estuary either natural or artificial. A plant of the gallery type is designated by 25, having an outer dyke 29 which, together with sea walls 26 separate the sea from the basin lying back of the power plant. The basin is preferably separated into a smaller reservoir P and larger reservoir R by a wall 27 or other suitable means, and the power plant proper comprises a housing 28 extending longitudinally of the plant in which the turbines, compensators and other desirable mechanism is located, the dyke 29 being spaced from and located in front of the power plant proper on the side facing the sea. In like manner, at the rear of the power plant proper there are dykes 30 and 31 separating the respective reservoirs from the gallery or corridor 40, which spaces the power plant from the dykes 30 and 31. In the space between the housing 28 and the dyke 29 is preferably a dyke 32, which divides the space into compensating wells 33 and 34. The well 34 is likewise divided by a horizontal partition 35 into upper and lower compartments, the purpose of which will later appear.

The front dyke 29 is provided with a siphon shaped channel 36 affording communication between the sea and the well 33, the upper portion of the channel being concaved at 37 so as to direct the water coming from the sea in a jet toward the bottom of the compensating well 33. This arrangement, together with the dyke 32, serves to break up any water hammers or eddies which may occur in the water as it flows in from the sea. The dyke 32 is pierced by two sets of passageways 38 and 39, the passageways 38 forming communication between the wells 33 and 34. The purpose of the passageway 39 will later appear. Between the power plant and the dyke 30 is a gallery or corridor 40 adapted to receive the water either from the reservoirs or turbines according to the phase of the cycle of the rise and fall of the tide and the resulting direction of flow of the water. Passageways 41 and 42 lead respectively from the well 34 and the corridor 40 to the turbine 43 located within the power plant housing 28. Leading from the turbine is a suction siphon passage 44 which has branches 45 and 46 at its lower end, one leading forwardly and the other rearwardly and connecting respectively with an underground conduit 47 formed by the partition 35 and with the corridor 40. The underground conduit 47 is connected with the well 33 by the passageway 39 and the corridor 40 communicates with the reservoirs by means of sluices 48. The various passageways 38, 39, 41, 42, 45, 46 and the sluice 48 are controlled respectively by sluice gates 49, 52, 50, 51, 53, 54 and 55, preferably operable and controlled from the power plant proper by suitable mechanism. In front of the passageway 36 are gratings 56, to obstruct and prevent materials likely to injure the turbine from entering the well 33, and for a similar purpose gratings 57 are placed over the passageway 42. Similarly the pedestals of masonry 58 and 59 are provided both on the seaside of the passages 36 and on the reservoir side of the sluices 48, the purpose of which is to arrest any heavy bodies from

end marginal portions flared outwardly and their outer end marginal portions flared inwardly to provide shoulders, said sections each of uniform diameter throughout their length except at said flaring ends, and a relatively shorter tubular section for each of said telescopic sections, snugly engaging the outer surface at the inner end of its respective section and engaging the outwardly flared marginal portion thereof, said telescopic sections when in a collapsed position having the said shorter tubular sections one within another, and when in an extended position, having said shorter tubular sections engaging the inwardly flared marginal portions to prevent separation of the tubular sections.

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