Jan. 7, 1947. J. F. BINDER 2,413,679

DEVICE FOR RETRIEVING SPHERICAL OBJECTS

Filed Oct. 8, 1945 3 Sheets-Sheet 1

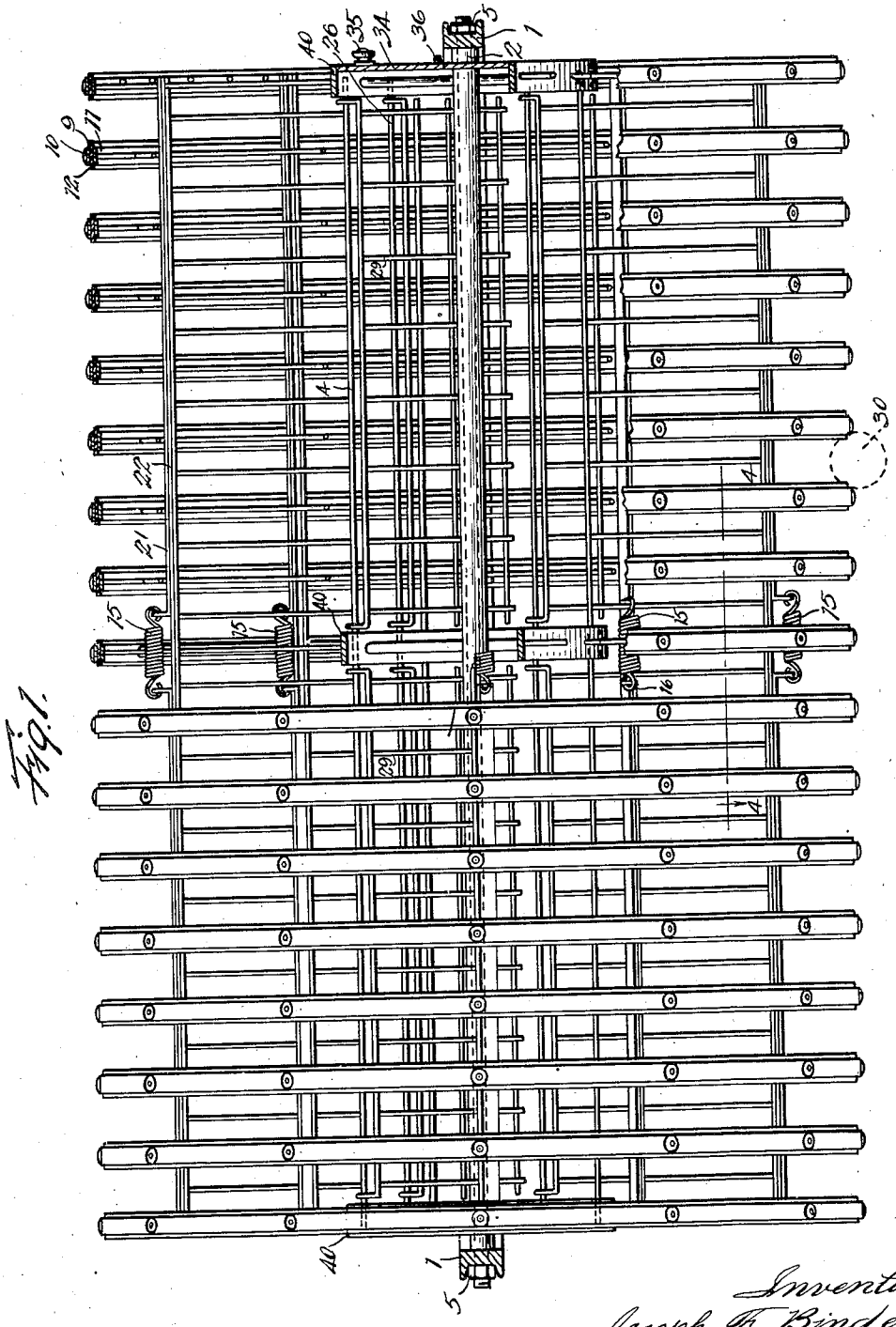


Fig. 1.

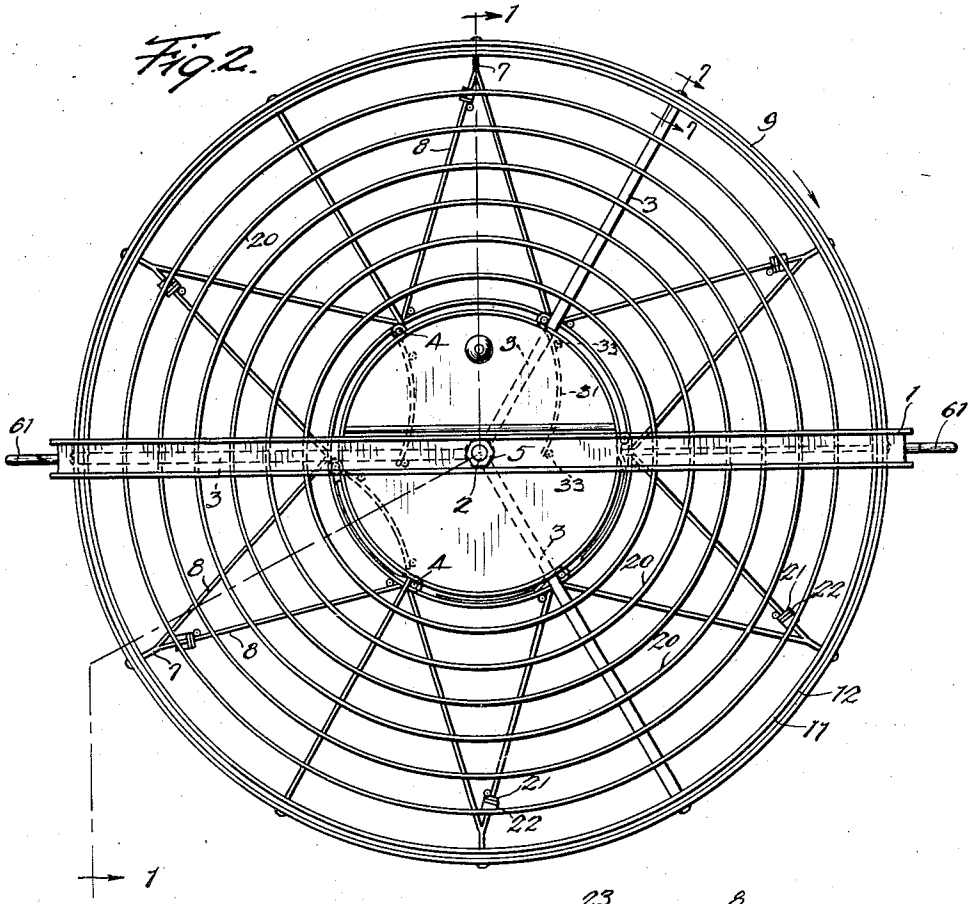
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Filed Oct. 8, 1945 3 Sheets-Sheet 2

Fig. 2.



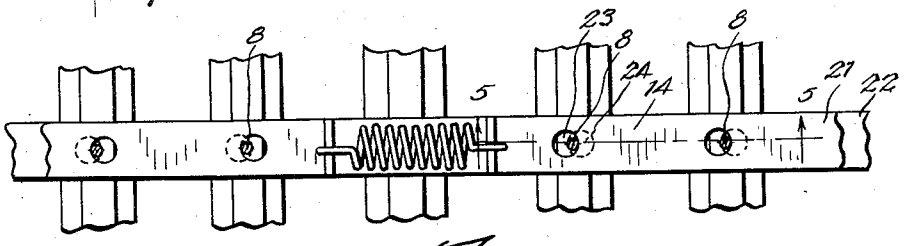


Fig. 4.

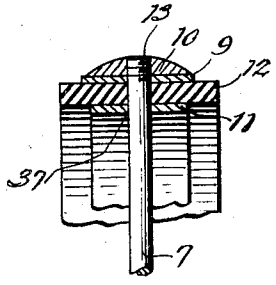


Fig. 7.

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Filed Oct. 8, 1945 3 Sheets-Sheet 3

Fig. 3.

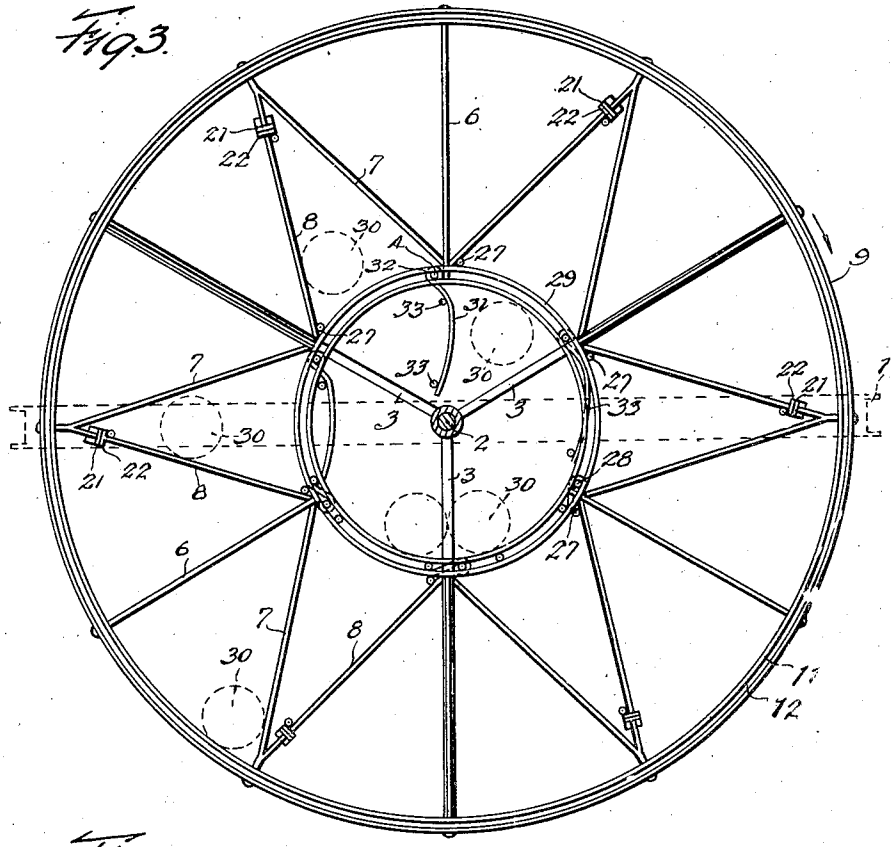


Fig. 5.

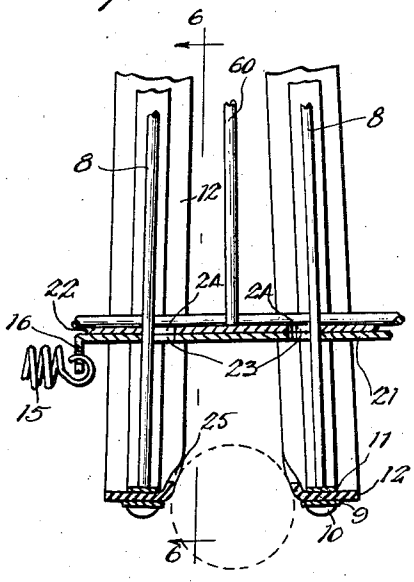
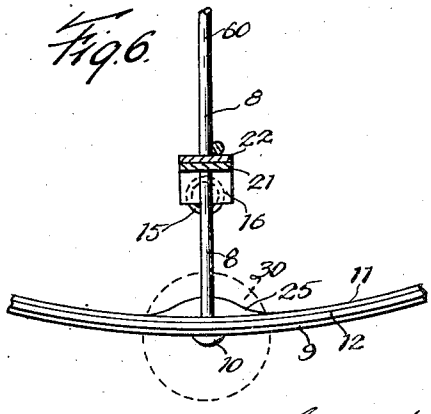


Fig. 6.



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UNITED STATES PATENT OFFICE

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DEVICE FOR RETRIEVING SPHERICAL OBJECTS

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Application October 8, 1945, Serial No. 620,863

8 Claims. (Cl. 214—65)

1

The present invention relates to a device for picking up and retrieving substantially spherical objects such for example as golf balls from surfaces upon which they are heterogeneously disposed.

The present invention concerns itself particularly with an effective and easily operated device which will pick up and retrieve spherical objects such, for example, as golf balls, from the surface of the golf course and particularly from ponds and other water hazards on said course without the necessity of any one entering into the water courses.

The device also has great utility in the picking up and retrieving of golf balls such as are promiscuously scattered over a considerable area in such places where golf driving practice is carried on. It is particularly in such places that the problem of inexpensively and quickly picking up the golf balls is of importance.

It has already been proposed to pick up golf balls by means of scoops and hand operated devices in which a person walks about the course and individually picks up each golf ball and then places it in a suitable basket or bag. This of course is an expensive and time consuming operation, and moreover requires the presence of the person picking up the balls on either the course or the driving range, where he not only is a disturbing element to the golfers that are practicing their driving, but is also in considerable danger of being hit by the ball. It has been the practice to periodically close down these driving ranges while the balls are picked up. It is self-evident that a mechanical device which will accomplish the rapid picking up and retrieving of the golf balls, thereby greatly shortening the shut down period, will be of great economical value. Accordingly applicant has perfected a device which mechanically accomplishes the picking up of golf balls from the ground as well as from the bottom of lakes and ponds.

Generally speaking, the device consists of a cylindrical cage suitably supported in a frame and capable of being rolled over the surface upon which the golf balls are disposed; the cage consisting primarily of a series of laterally aligned resiliently mounted hoops which are spaced a distance apart that is slightly less than the diameter of a golf ball, but with the hoops so arranged that they are capable of spreading to an extent sufficient to permit a golf ball to enter therebetween particularly when the ball also serves to deflect resilient edges on said hoops.

2

These edges may be made of any type flexible rubber-like material.

For convenience there is also provided an internal cage concentrically mounted with the outer cage and preferably made up of small rods or wires into which central cage the retrieved balls can be elevated and rolled so that they will accumulate therein so that a much larger number of balls can be picked up than if the balls which had entered the cage were merely allowed to roll around therein, as under such circumstances they might interfere with the proper pick up of further balls.

In order to illustrate the invention in its preferred embodiment, but without in any wise desiring to limit the scope and purview of the present invention the same has been illustrated in three sheets of drawings in which

Fig. 1 is a front elevational view of the device shown partially in section;

Fig. 2 is an elevational end view of the device;

Fig. 3 is a sectional view between each of the individual hoops of which the device is made, also illustrating in dotted lines the various positions of balls being transferred from the outer to the inner cage;

Fig. 4 is a sectional veiw on an enlarged scale along the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary view partly in section along line 5—5 of Fig. 4, and on a somewhat enlarged scale, showing a small portion of the device in the position in which a ball is just about to enter the same;

Fig. 6 is a view similar to Fig. 5, but taken at right angles thereof along the line 6—6 of said Fig. 5;

Fig. 7 is a detail partly in section and on an enlarged scale, of the manner of attaching the resilient edging members to the hoops themselves.

In order to constitute the ball entrapping cage of the present invention there is provided a substantially rectangular frame 1 provided with a centrally thereof located shaft 2, to which there are affixed primary metal strap spokes 3 of which there may be for instance three in number spaced at any angle of 120 degrees apart. These primary spokes as they will hereinafter be designated are used in the two end and center hoops only and serve to give the necessary rigidity to the device.

The primary spokes support an inner wire cage made up of a plurality of transverse wires 4 which run parallel in direction to the shaft 2. This shaft is of course rotatable within the opening provided for it in frame 1, the shaft being re-

tained in place, when the entire device is assembled, by suitable nuts 5.

The cage is strengthened by three metal rings 40, one at each end and one in the center of the device. Radiating from the inner cage made up of wires 4 there are secondary wire spokes 6, 7 and 8 which serve to support the hoops 9 consisting of metal strips which are secured by threaded bosses 10. The exact construction can best be seen from Fig. 7. There are also second strips 11, of slightly less diameter, between which strips there is mounted an internal hoop 12 which is made of a suitable flexible material such as rubber or the like. Said secondary strips 11 are preferably spot-welded at 37 to the spokes 6, 7, and 8. The spokes are provided with threads at 13, the outer strip 9 being affixed by screwing the boss 10 thereto, the said boss being internally threaded to correspond and mesh with the threads on the end of the spokes.

The entrapping cage in which the objects, such as golf balls, are caught consists of about 17 individual wheels consisting of the hoops and their supporting spokes and therefore description of any one of them will make understandable the construction of the entire device.

Referring particularly to Figs. 2 and 3: Fig. 2 is an end view showing a plurality of concentric wires 20 which of course are necessary in order to have circular ends on the otherwise cylindrical cage, and to keep the balls from falling out of the cage when the same is rotated. The spacing between the wires 20 therefore must be less than the diameter of the balls collected.

The spacing between the individual wheels or hoops is maintained in the following manner: The spokes 8 pass through two superimposed longitudinal strips 21 and 22 which are in close juxtaposition to each other, and which are slidable one over the other, see particularly Figs. 4 and 5. The innermost strip 22 is supported by supporting spokes 60, the ends being butt-welded to the strip (see Fig. 5). The spokes 8 pass through openings 23 of the longitudinal strip 22 and the corresponding opening 24 in the strip 21, these openings being capable of being brought into alignment whenever the hoops are displaced relative to each other as by the entry therebetween of a golf ball or the like, as particularly illustrated in Fig. 5.

Ordinarily the tendency is for the two strips 22 and 21 to slide over each other by reason of the fact that the lower strip 21 (by "lower" is meant that strip which is nearest the periphery of the hoops) is urged toward the center of the device by means of the springs 15 which engage the ears 16 on the said strips 21. This normally will therefore pull the strips against the one side of the openings 23 and 24, therefore tending to keep the hoops in alignment. However, when a ball is encountered it will tend to push the hoops apart and a certain limited amount of movement is permitted as a result of which the hoops get into the slightly oblique position as shown in Fig. 5.

In order to take care of slight inequalities in the diameter of the balls and also to insure the retention of the balls within the interior of the cage, there are provided the already mentioned resilient strips 12 which will bend, as indicated at 25, when a ball enters between the hoops.

The central ball-retaining cage is comprised primarily of longitudinal wires 4, 27 and 28 which support circularly bent wires 29 which are sufficiently closely spaced together so as to give

adequate support to the inner cylindrical collecting basket. This basket is intended for the reception of the balls or other spherical objects which have been picked up.

As indicated in Fig. 3, and assuming that the device is pulled to the right so as to cause a clockwise movement thereof, the balls 30, indicated in dotted lines, will tend to be pushed upwardly to the left, and eventually will roll down along the spokes 8 until, as shown in the upper left quadrant of Fig. 3, they get near an opening provided by the falling open of the trap 31 which is made up of a plurality of wires which are hinged on the longitudinally extending wires 4 of the central cage and which are connected to each other by longitudinal wires 33. These wires are suitably spot-welded to each other. The result being that there are provided six traps 31 which will, when the hinge 32 that supports them is in the vertical position, allow them to hang straight down, therefore leaving an opening through which the ball 30 can fall.

As the wheel continues its rotation, the wire trap door 33 will fall into the position where it will close the opening, and therefore the balls can now ride over the same and be retained in the central collecting cylinder or basket. This basket is suitably closed at each end of the cylinder by a door 34 supported in one of the rings 40, and having a knob 35 preferably being hinged at the point. By opening this door and up-ending the cylinder so that its axis will be vertical, the balls can be caused to fall out either on the ground or into a suitable receptacle. Thereafter, by again placing the device in the horizontal position and closing the door 34, the device is again in condition for further operation.

Whenever a contact is made other than with the spokes 7 and the threaded boss 10 upon the threads 13 of the spokes, the connections are accomplished by spot welding 37 as indicated in Fig. 7.

In constructing the device each wheel is individually made up, and they are then slipped on to the shaft 2 and connected together, the springs 15 being put into place so as to actuate the strips 21. Suitable ears or hooks are provided on the frame 1 so that the entire device may be either pushed or pulled over the surface upon which the objects which are to be picked up are disposed. When this happens to be under the water, it is advantageous to attach a chain or rope to the device as for instance upon ears 61 and then to roll it down from one embankment into the pond or lake and then to pull it up on to the other side by means of the rope or chain, so that the device will be caused to roll across the bottom of the pond. By rolling it back and forth each time shifting it a distance approximately equal to its length, the entire bottom of the pond or pool can be thus explored, and each golf ball or the like lying on the bottom thereof picked up or retrieved.

When operating on dry ground the device may be either pushed or pulled by hand or by a suitable vehicle.

The entire device may be constructed inexpensively out of still galvanized wire or the like, and is comparatively light in weight so that it will not harm the sod or grass over which it may be rolled. The distance between the extreme edges of the hoops that is as measured from the extreme edge of two adjacent rubber-like edge members 12, should be about ¼" to ½" less than the actual diameter of a golf ball.

The amount of movement is controlled of course, by the size of the openings **23** and **24** and this is preferably equal to about three times the thickness of the spokes **8**.

Obviously it is possible to omit the central cage and to use merely the outer cage, with the obvious lesser advantage of having to unload the device more frequently, but such a construction is considered as within the scope of the present invention, for which applicant claims:

1. A device for picking up substantially spherical objects comprising a cage consisting of a plurality of aligned hoops spaced apart a distance slightly less than the diameter of said objects, said hoops being provided with resilient edges capable of yielding under pressure to admit the object to the interior of said cage.

2. A device for picking up substantially spherical objects comprising a plurality of resiliently supported aligned hoops constituting a cylindrical cage, end-members comprising a plurality of concentric hoops of diminishing diameter to constitute the ends of said cage, said aligned hoops being capable to slight movements relative to each other and spaced apart when aligned a distance slightly less than the diameter of the objects to be picked up, resilient edge-members on said aligned hoops; a central object receiving inner cage, means for directing objects picked up into said inner cage, and means to retain said objects in said inner cage.

3. A device for retrieving golf balls which comprises a cylindrical entrapping cage made up of a plurality of hoops laterally aligned and spaced a distance apart that is slightly smaller than the diameter of a golf ball, said hoops being supported in a manner to permit slight movements relative to each other so as to admit a golf ball therebetween so that it may enter the entrapping cage, resilient yieldable members on said hoops permitting the passage of golf balls under applied pressure; a smaller cylindrical receiving-cage concentrically mounted within the entrapping cage, and means for transferring and retaining retrieved balls into and within said receiving cage.

4. A retrieving device for spherical objects, comprising the combination of a rectangular frame, a transversely therein positioned shaft, a cylindrical entrapping cage comprising a plurality of flat hoops laterally aligned and spaced such a distance apart that in their normal position they are closer together than the diameter of said objects, mounting means comprising spokes connecting said hoops with said shaft, said means permitting slight movement of said hoop relative to each other to spread them momentarily apart sufficiently to permit the spherical object to pass there between, resilient edge-members on said hoops; a central concentric cylindrical receiving cage positioned within said entrapping cage, hinged trap-doors on said receiving cage, and means including said spokes to direct the spherical objects into said receiving cage.

5. A golf-ball retriever comprising a rotatably mounted cylindrical cage consisting of a plurality of spaced hoops supported from a centrally located shaft, the edges of said hoops being spaced apart a distance slightly less than the diameter of the ball that is to be retrieved, yieldable edging-means on said edges permitting passage of a ball upon pressure being exerted thereon, said hoops being movable relative to each other but resiliently biased to return to their original position after the passage of a ball therebetween; and means, comprising a centrally located inner cage, for accumulating the returned balls.

6. A retrieving device for spherical objects comprising a rectangular frame, a shaft rotatably journaled thereon, spokes radiating from said shaft, a plurality of hoops supported by said spokes and spaced apart a distance less than the diameter of the objects to be retrieved, said hoops being movable relatively to each other a distance sufficient to permit passage of an object to be picked up there between, means biasing said hoops in a direction to re-establish their original spacing upon the completion of the passage of said object, thereby forming an entrapping cage; a concentric smaller cage within said entrapping cage; gravity-operated gates on said smaller cage, means for elevating and rolling entrapped objects to and into said smaller cage; and means affixed to said frame to move said device over the surface upon which the objects are disposed.

7. The device claimed in claim 5 in which the hoops are constructed in part of a resilient rubber-like material.

8. A retrieving device for picking up substantially spherical objects from a surface upon which they are heterogeneously disposed comprising the combination of a rectangular frame, a shaft journaled thereon, primary spokes radiating from and attached to said shaft, an inner cylindrical wire cage affixed to and supported by said primary spokes; secondary wire spokes attached to and radiating from the outer periphery of said inner cage; hoops supported by said secondary spokes, said hoops being spaced apart a distance slightly less than the diameter of the objects that are to be picked up; flexible edging-members on said hoops; means permitting relative movement between said hoops and means biasing said hoops to their original spacing after being displaced; gravity-operated trapping means on said inner cage; means for elevating and rolling picked-up objects up to and into said inner-cage; and means on said frame for imparting movement thereto in a direction at right angles to said shaft, whereby the entire device may be caused to roll over said surface.

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