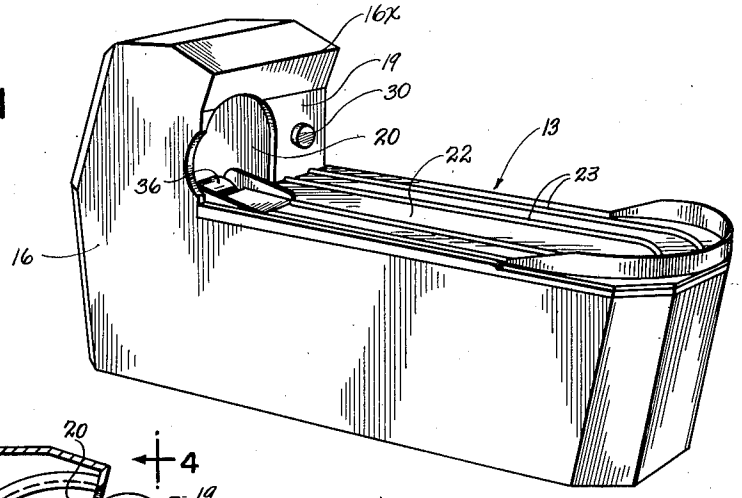
June 18, 1957 M. F. TURNER 2,796,261

BALL STORAGE RACK

Filed Nov. 16, 1953 2 Sheets-Sheet 1

Fig. 1



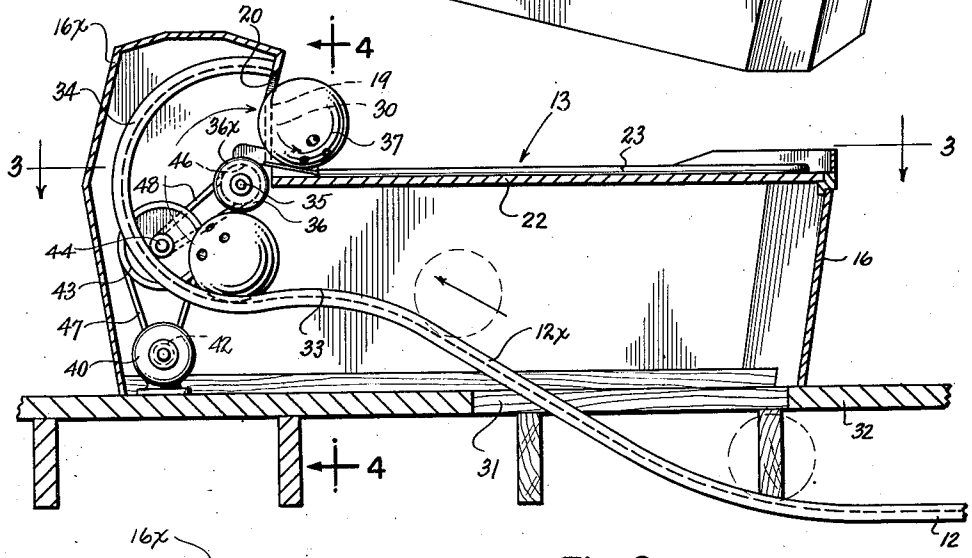




Fig. 2

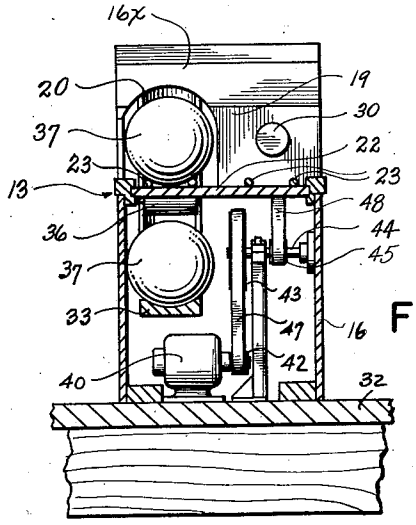



Fig. 4

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BALL STORAGE RACK

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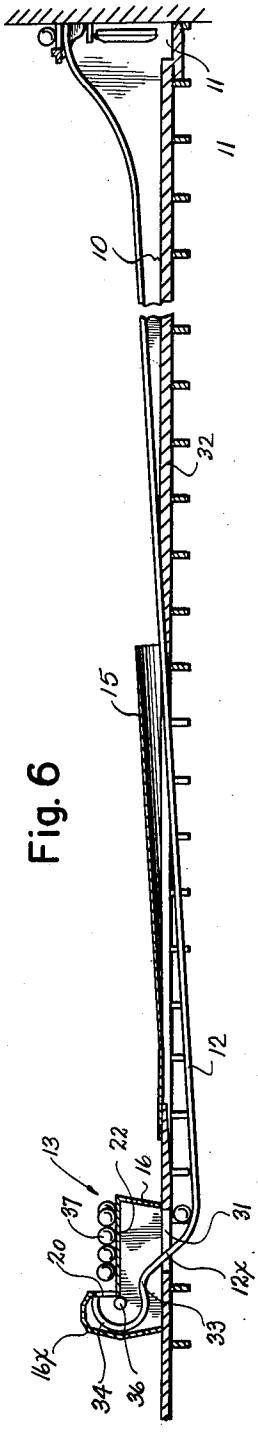

Fig. 6

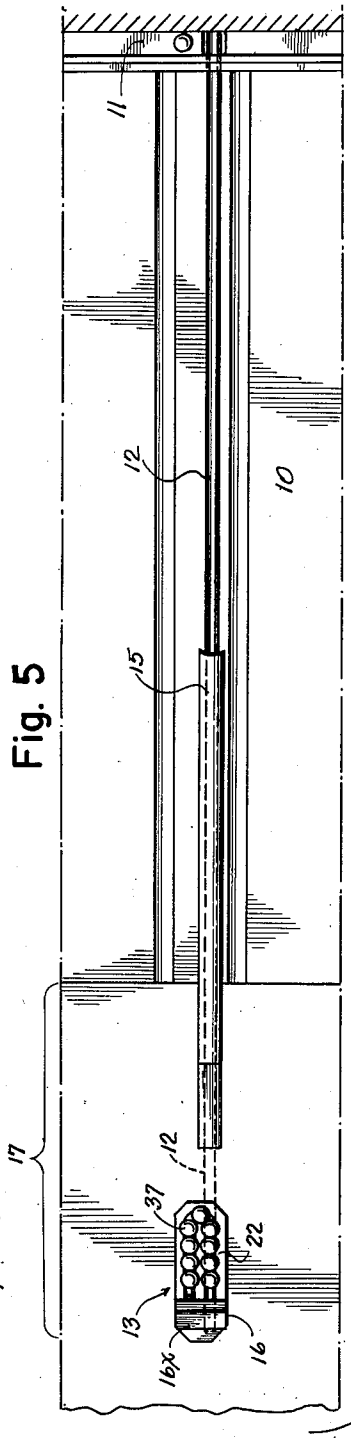

Fig. 5

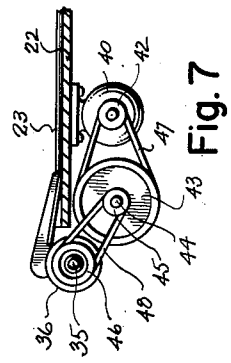

Fig. 7

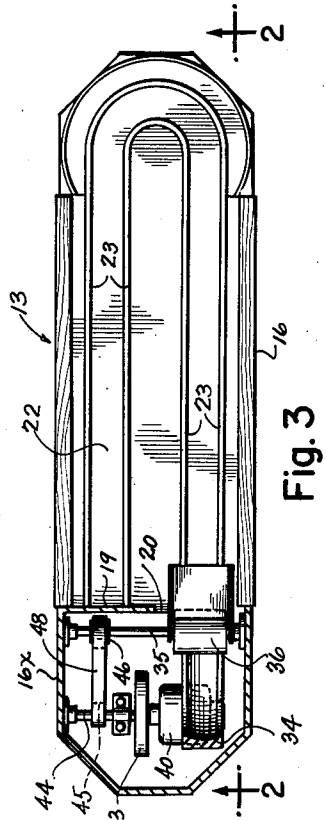

Fig. 3

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2,796,261

# BALL STORAGE RACK

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Application November 16, 1953, Serial No. 392,203

1 Claim. (Cl. 273—49)

This invention relates to bowling alleys, and it has reference more particularly to an improved form of ball storage rack to which the bowling balls are returned from the pin pit end of the alley along a trackway or trough that may be entirely or partly under floor.

It is the principal object of the present invention to provide a novel form of storage rack that is adapted to receive the balls from an under floor return trough, and which, by reason of a special reverse turn in the ball storage trackway, is substantially shorter than storage racks now universally in use. Furthermore, it is an object of the invention to provide a storage rack that does not divide or extend into the approach area to any appreciable extent.

A further object of the invention resides in the provision of a ball storage rack that extends lengthwise of the alley and receives the returned balls from the under floor return trough at the end thereof which is farthest from the alley.

Another object of the invention is to provide a ball lift in association with the storage rack and by means of which the returned balls are delivered from the return trough to the storage track while rotating in a direction that is reverse to that which they must turn in rolling along the storage track, thus to cause an automatic retarding of their speed of travel.

Still further objects and advantages of the present invention reside in the details of construction of the storage rack; in the combination of the present rack with the under floor ball return trough; in the ball lift mechanism and the particular manner in which the balls are delivered to the ball storage track.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of that portion of the present ball storage rack that is seen above floor level.

Fig. 2 is a sectional view, taken in the longitudinal vertical plane of the present ball storage rack and ball lift apparatus associated therewith.

Fig. 3 is a horizontal section, taken on line 3—3 in Fig. 2, particularly showing the ball storage trackway with the reverse bend.

Fig. 4 is a vertical, cross-section taken on line 4—4 in Fig. 2.

Fig. 5 is a diagrammatic, plan view of a bowling alley as equipped with the present ball storage rack.

Fig. 6 is a sectional view illustrating the disposition of a part of the ball return track or trough below the level of the approach area of the alley.

Fig. 7 is a sectional view showing an alternative ball lift mechanism for use with the present apparatus.

Referring more in detail to the drawings:

In Figs. 5 and 6, I have rather diagrammatically illustrated a bowling alley with which a ball storage rack and under-floor ball return trough have been installed. In these views the alley is designated in general by numeral **10**; the pin pit by number **11**; the ball return trough or track by numeral **12** and the present storage rack is designated in its entirety by numeral **13**.



It will be noted, particularly in Fig. 6, that the ball return track or trough **12** is inclined downwardly toward the rack **13** from an elevation which is substantially above the level of the pin pit, passing through and below the floor surface about midway of the ends of the alley and at a point below the storage rack it is curved upwardly and leads into the rear end of the storage rack housing, as will presently be fully described. It is preferred, as is herein shown, that the elongated opening in the floor through which the return trough passes be covered with a hood as designated at **15**. During the initial part of its return to the storage rack, each ball is visible to the players.

Referring more particularly to the storage rack **13**: This comprises an enclosure or housing **16** of box-like form, approximately eighteen inches wide and seventy inches long; this housing being disposed lengthwise of the direction of the alley and at the head end of the approach area as indicated in Fig. 5. The approach area is that portion within the bracket **17** in Figs. 5 and 6. At that end which herein will be designated as its rear end, the housing **16** has an elevated hood portion **16***x* with a forward wall **19** which is formed as seen in Fig. 4 with an opening **20** through which the bowling balls, as delivered from the ball return track, are discharged onto a storage track that is provided to receive them on the top wall **22** of the housing that extends forwardly from the hood portion **16***x*.

In the longitudinal sectional view of the housing **16**, as seen in Fig. 2, and the cross-sectional view of Fig. 4, it is shown that the top wall **22** of the housing is substantially horizontally disposed and that the ball storage trackway thereon is in the form of an elongated U, with the closed end of the U located at the forward end of the housing, and the ends of the legs of the U terminating at the wall **19**. The ball storage trackway, as now formed, comprises two lengths of ½" pipe **23**, bent to the desired U form, and secured in parallel spaced relationship upon the top wall **22** as shown in Figs. 3 and 4. One leg of the U-shaped trackway terminates at, or registers with the opening **20** that is formed through the wall **19** as will be understood by reference particularly to the showing in Fig. 4. The ball storage trackway, from its receiving end which is adjacent the wall opening **20**, has a gradual downward slope to its opposite end. The total drop in elevation from end to end is about ⅜" to ½". At the closed end of this trackway, which terminates adjacent the wall **19**, a resilient bumper **30** is mounted on the wall at proper elevation to act as a shock absorbing cushion for balls to strike against as they come to the end of their travel after being received on the trackway.

Referring more particularly to Figs. 3 and 4, it will be understood that the ball return trackway **12** leading from adjacent the pin pit end of the alley enters the housing **16** in an upwardly directed curve passing through an elongated opening **31** in the floor **32** on which the housing **13** is mounted. The upwardly curved portion **12***x* of this trough or trackway, merges gradually into a somewhat downwardly curved portion **33** which, in turn, leads into the lower end portion of a continuing and semi-circularly curved portion **34**. At its upper end, the part **34** terminates at the wall **19** flush with the top edge of the wall opening **20**; these parts **12**, **33** and **34** being in the relationship best shown in Fig. 2. It is to be noted that there is a slight downward dip in the ball trough at the lower end of part **34**. This will retain the

bowling balls against rolling back once they pass over the part 33.

Mounted coaxially of the axis of curvature of the trackway portion 34 is a driven shaft 35 on which a friction wheel 36 is fixed. This wheel has a rubber covered surface designated at 36*x*. The distance between the peripheral or cylindrical surface of the friction wheel and trackway 34 is uniform and is just slightly less than the diameter of the bowling balls, so that as the balls are delivered from trackway 12, across the curved portion 33 to the circularly curved section of the trackway designated at 34, they will engage with the driven roller 36 and will be rolled thereby along the trackway 34, up and over the friction wheel and will be discharged through the wall opening 20 onto the receiving end of the ball storage trackway as mounted on the top wall 22 of the housing.

One of the features of the present invention is that the bowling balls, designated by refeernce numeral 37, as discharged onto the storage trackway are rotating in a direction reverse to that required of them for rolling along the trackway. Therefore, when passing from the track member 34 onto the storage trackway, they automatically are stopped in their counter-clockwise rotation, in reference to their showing in Fig. 2, and their momentum is overcome. Then they begin to roll along the trackway under the influence of gravity and will continue to roll until stopped. The first ball that is received on the storage trackway will travel therealong and finally be stopped when it engages the resilient bumper. The successively delivered balls contact one with the other and come to rest as has been indicated by their dotted line showing in Fig. 2.

The preferred means for driving the friction wheel 36 is shown in Figs. 3 and 4 wherein 40 designates an electric motor that is mounted in housing 13, on the floor and beneath the section of trackway 34. The motor shaft is equipped with a small pulley 42, which is aligned with a substantially larger pulley 43 on a revolubly mounted supporting shaft 44. Fixed on shaft 44 is a small pulley 45 aligned with a larger pulley 46 that is fixed on the shaft 35. A belt 47 operates about the pulleys 42 and 45 and a belt 48 operates about the pulleys 45 and 46. Thus the friction wheel 36 is driven at a speed found to be the most practical for the present operation.

With the apparatus so constructed and associated with a bowling alley as shown in Figs. 5 and 6, it will be understood that a bowling ball placed in the return trackway at the pin pit will roll along the trackway or trough 12 with sufficient momentum to carry it up the inclined portion 12*x* and into contact with friction wheel 36, to be rolled by reason of its contact with that wheel up and over the wheel as indicated in Fig. 2, and finally discharged onto the receiving end of the storage trackway, to roll therealong until stopped. In the present instance the storage trackway will accommodate about twelve balls and by reason of the reverse bend in this trackway, the length of the housing 16 can be reduced to about half that of the usual storage rack for a like number of balls. Thus, with the housing 16 disposed as herein shown, the approach area is left clear for a substantial space leading up to the foul line. It is in this reverse bending of the storage trackway in a ball storage rack that is disposed lengthwise of the alley, as indicated in Fig. 5, that the advantage resides. The relationship of return trough 12, to the storage rack 13 is of importance and is a feature of this invention.



In Fig. 7, I show the motor attached to the housing wall 22 and belt connections with the shaft 35 that are substantially like and provide the same driving reduction as in the driving connection shown in Fig. 2. Corresponding reference numerals are used in this view.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

In a bowling alley including an approach area at the players end, and a ball return trough leading from the pin pit end of the alley to the players end and passing beneath the surface of the approach area; a ball storage rack for returned balls disposed at the players end of the approach area and extended in the direction of the alley and having a ball storage trackway therein at a level substantially above the surface of the approach area, and a ball guideway leading from the discharge end of the ball return trough for the delivery of returned balls to the receiving end of the ball storage trackway, said ball guideway having an initial portion that first continues in an upward slope from the return trough, and then curves slightly downwardly, and continues as a semi-circularly curved section leading upwardly and above the receiving end of the said storage trackway, all parts of said guideway being in the same vertical plane of the ball return trough, and a driven friction roller disposed coaxially of the axis of curvature of said semi-circularly curved section and spaced therefrom for its frictional contact with balls as received in said section for their rolling advancement therealong and their ultimate discharge onto the receiving end of the storage trackway in a direction of rotation that is reverse to that required for them to roll along the storage trackway; said storage rack having a length that is relatively short compared with the length of the approach area, and said trackway being of U-form, supported on top of the rack in a plane that is substantially horizontal, with the open end of the U directed away from the alley and arranged to receive returned balls on one leg of the trackway for travel toward the opposite end, and a ball stop at the end of the trackway.

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