This invention relates to method and apparatus for leveling, adjusting elevation, and repairing worn or warped portions of the surface of bowling alleys.

The surface of a bowling alley is subject to uneven wear by bowling balls during play. Such wear results in the formation of depressions in the surface of the alley which affect the course of the ball and are hence undesirable. Changes in temperature and humidity can also cause warping of the surface of the bowling alley, with a similar undesirable effect.

It is accordingly an object of the invention to provide improved means for leveling a portion of the surface of a bowling alley.

Another object of the invention is to provide improved means for elevating a worn portion of a bowling alley to a level superior to that of the alley proper, to facilitate repair thereof.

Still a further object of the invention is to provide an improved method for repairing worn portions of the surface of a bowling alley.

Broadly, the apparatus of the present invention comprises an externally threaded sleeve adapted to be threadably embedded within a vertical bore in a board of a bowling alley, a screw threadably engaged within said sleeve, and a bearing cup adapted to rest upon a leveling strip below said board and to receive the lower end of said sleeve. The method of the present invention comprises, broadly, drilling a bore downwardly into said board, dropping said bearing cup downwardly through said bore to rest upon said leveling strip, screwing said sleeve downwardly into said board completely below the upper surface of the board, and then screwing said screw downwardly within said sleeve and against said bearing cup to raise the upper surface of said board to an elevation superior to that of the alley proper. A hardwood plug is then inserted into said bore in said board, and the portion of the bowling alley thus elevated is sanded to the level of the alley proper and is varnished. The above and other objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated, by way of example only, in the accompanying drawings, forming a part of this specification in which like characters are employed to designate like parts throughout the same, and wherein:

FIGURE 1 is a perspective view of a bowling alley adjustor with locking screw removed.

FIGURE 2 is a vertical section of a bowling alley adjustor operatively employed to elevate a portion of a bowling alley.

FIGURE 3 is a cross-section of a bowling alley, showing a depressed area worn in the surface thereon.

FIGURE 4 is a cross-section of a bowling alley showing a worn portion thereof elevated to a level superior to that of the alley proper.

FIGURE 5 is a cross-section of a bowling alley showing a previously worn portion thereof after repair.

Referring now more particularly to the drawings, a conventional bowling alley is formed by a plurality of elongated, interconnected tongue and groove hardwood boards having gutters along the sides of the array. Boards rest upon a one-half inch thick layer of Celotex or similar material which cover a plurality of transversely arranged leveling strips formed from common two inch by four inch lumber. Leveling strips are supported by a plurality of wooden stringers which, in turn, rest upon a concrete slab.

While the particular materials and construction may vary considerably from one bowling alley to another, the construction of all bowling alleys is similar in their provision of boards and of leveling strips which support the boards from below. Repeated use of the bowling alley results in wear of the surface of boards, creating depressions, such as that shown at 22 in FIGURE 3, in portions thereof.

We form from steel or other metal a sleeve, generally indicated at 24, of a height less than that of boards 10, bearing external threads 26. Preferably, standard ½ inch 11, and having a slot 28 in the upper end thereof, an internally threaded bore 30 extending longitudinally therethrough. A headless steel screw 32 is provided, and bears conventional recessed gripping and turning means at the upper end thereof, such as an hexagonal socket 34, external threads 36 adapted for engagement with threaded bore 30, and preferably a beveled lower end 38. A metal bearing cup 40, preferably formed of steel, is also provided, and bears a recess 42 drilled into the top thereof. The outside diameter of bearing cap 40 is slightly less than the minor diameter of external threads 26 of sleeve 24 and preferably of ½ inch, and the inside diameter of recess 42 is slightly greater than the major diameter of threads 36 of screw 32. A short headless locking screw 44, also adapted for engagement with threaded bore 30 and bearing gripping and turning means, such as an hexagonal socket 46 identical to socket 34, is also provided.

To repair depression 22, a vertical bore 48, having a diameter equal to the minor diameter of external threads 26 of sleeve 24 and preferably of ½ inch, is drilled downwardly through every third or fourth board 10 within the depressed area, to the layer of Celotex 14, bearing upon a leveling strip 16 therebelow. A counterbore 49, approximately ⅛ inch in diameter, is then drilled into the upper end of each bore 48. Each bore 48 is then threaded, by a conventional steel tap, to receive threads 26 of sleeve 24. A bearing cup 40 is then dropped downwardly into each bore 48, to rest upon leveling strip 16 with its recess 42 facing upwardly.

A sleeve 24 is then coated with an epoxy resin glue and screwed downwardly into each bore 48, respectively, slot 28 being utilized to receive the blade of a screwdriver or similar tool for such purpose, until the upper end of the sleeve is substantially below the upper surface of board 10. A screw 32 is then threadably engaged within bore 30 of each sleeve 32, respectively, if not already so engaged, and screwed downwardly therein until lower end 38 thereof is seated within recess 42 of the bearing cup 40 therebelow, suitable means, such as a hex wrench, being engaged with socket 34 of the screw for such purpose.

Further rotation of each screw 32 then compresses Celotex against leveling strip 16 and forces each sleeve upwardly, away from bearing cup 40 and the leveling strip, thus elevating the sleeve and board 10 in which it is embedded. Since each board 16 is interlocked with the adjacent boards by tongue and groove construction, glue, screws, or similar means, such boards adjacent to those in which sleeves 24 are embedded are also elevated or deformed upwardly during the process, thereby arching upwardly all of boards 16 within the depressed area, as best shown in FIGURE 4.
When the entire upper surface of area 22 has been thus raised to an elevation superior to that of the surface of the bowling alley proper, a locking screw 44 is screwed downwardly into the bore 30 of each sleeve 24 and wedged tightly against the top of screw 32 therein, thus firmly locking screws 32 in place within sleeves 24.

A hardwood plug 50 is then driven and glued into the upper end of each bore 48, stop sleeve 24 therein. Area 22 is then sanded down precisely to the level of that of the bowling alley proper, and varnish or a similar conventional protective coating is applied thereto. The surface of the bowling alley is thus quickly, easily, and economically repaired and restored to level.

Should it be necessary to repair the same area of the bowling alley again, plugs 50 may be removed by drilling, locking screws 44 unscrewed from bores 30, and the heads of screws 32 thus exposed. Screws 32 may then be screwed further downward within sleeves 24 until boards 10 have been further elevated to the new desired elevation, whereupon locking screws 44 and new plugs 50 may be again inserted and area 22 again sanded and refinished in the same manner as heretofore described.

While we have shown and described our invention primarily as used to elevate and repair a depression in the surface of a bowling alley, it may with equal facility and result be used to raise the level or straighten warped portions of the surface of a bowling alley and to lower the elevation of portions thereof which have been previously so raised but which have subsequently heaved upwardly. Further, the invention is not limited to use with bowling alleys but may be used with any other game boards which lend themselves to the method and apparatus herein described and claimed.

It is further to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the same and that resort may be had to various changes in construction without departing from the scope of the subjoined claims.

What is claimed is:

1. In combination with a bowling alley board and a leveling strip supporting said board from below, an externally threaded sleeve having a transverse slot in the upper end thereof and adapted to be embedded completely within said board by threadable engagement with a vertical bore extending through said board, an internally threaded longitudinal bore extending downwardly through said sleeve, a bearing cup having an upwardly disposed recess therein, and adapted for insertion into said bore in said board and to be supported by said leveling strip, a first screw arranged for adjustable, threadable engagement with said threaded bore of said sleeve, the lower end of said first screw being received within said recess in said bearing cup and the upper end of said first screw being disposed below the upper end of said sleeve when said lower end of said first screw extends below the lower end of said sleeve, means for gripping and rotating said screw to force and maintain said sleeve and board upwardly from and in spaced relationship with said bearing cup and leveling strip, a locking screw adapted for threadable engagement within said threaded bore of said sleeve above said first screw and disposed to contact, and to be wedged against the upper end of first screw to restrain said first screw against rotation, and means for gripping and rotating said locking screw.

2. The method of repairing a worn portion of the surface of a bowling alley supported by support means comprising, drilling a vertical bore downwardly through at least one of the boards of said alley, dropping bearing means downwardly through said bore to rest upon said support means, threadably engaging an externally threaded sleeve within said bore from above, screwing a screw downwardly through a threaded bore within said sleeve and against said bearing means to force said board upwardly from said support means until the upper surface thereof is above the level of that of the bowling alley proper, inserting a plug into the top of said bore in said board, and sanding the upper surface of said board and plug down to the desired elevation.

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