An apparatus and a method that is used to mechanically remove flooring tiles intact from the foundation and then after the foundation and tile surfaces have been prepared, the same tile is set undamaged.
APPARATUS AND METHOD FOR REMOVING FLOOR TILE

BACKGROUND—FIELD OF INVENTION

[0001] The apparatus relates to removing fully set tiles in one room to be used in other areas of a floor for the purpose of replacing noticeable cracked tiles or tiles that cannot be repaired. The apparatus also relates to grouted ceramic, marble, stone, or porcelain flooring tiles that have separated in part from the underlying foundation for the purpose of resetting them properly.

BACKGROUND—DESCRIPTION OF PRIOR ART

[0002] Repair of cracked flooring tiles and flooring tiles that have partially separated from the base structure is currently done by means that produce little success. First the grout surrounding the tile is chipped or cut out. Second, in the case of a cracked tile, the tile is then chipped out in pieces and a new tile is installed, matching or not, end of story. Second, in the case of the partially separated tile, it must be pried out using a chisel hammered under it. However, chances are good that the tile will crack at or near where the prying force on the chisel was applied. If the job is successful then the tile and underlying structure are properly cleaned and the old tile is reset using a thin-set mortar or other comparable adhesive. If the tile cracks during the procedure then a new tile must be substituted.

[0003] The problem with repairing the cracked tile and the partially set tile is that if the tile cannot be saved and there are no extra matching tiles available then the appearance of the floor is greatly diminished because of the mismatched tile used to replace the broken one. Separation and cracking can occur because of a shift in the foundation, poor application of thin-set mortar, or a lack in the expansion joints. If a separated tile is not repaired then it will crack with time and normal use.

[0004] Prior art attempted to solve this problem of repairing separated tiles in two ways. The first was injecting an adhesive under the tile through a drilled hole illustrated by DiStefano U.S. Pat. No. 5,000,880. This method does address salvaging the original tile but there are three problems with this method. First, the equipment required for the job is expensive. Second, the machines are complicated to operate for an ordinary person making this method of repair only available to an experienced technician. Third, the injected adhesive may not be able to penetrate and flow into all of the hollow spaces between the tile and the foundation to provide adequate and proper setting of the tile. If the adhesive injection is still unsuccessful then removing the tile intact by conventional methods will be near impossible and would have to be chipped out in pieces. The end result to the consumer is a higher cost and less than a high probability of success and in a worst case scenario leaving only a destructive method of tile removal and replacement with a new tile.

[0005] The alternative is to forgo any repair of an individual tile and instead remove the separated tile in pieces and replace it with a new one. The first of the destructive methods to remove the tile uses a torch to crack the tile then remove the pieces and is illustrated by Gerbasi U.S. Pat. No. 6,027,174. The second is to use a mechanized chipper to break the tile and is illustrated by Holder U.S. Pat. No. 6,523,906 and Worden U.S. Pat. No. 5,713,637.

[0006] Finally a prior art still pending by the York CIP application Ser. No. 10/712,602 is the closest of all prior art in solving the problem of both cracked and partially separated flooring tiles. Here the apparatus is suspended over the tile to be removed and uses at least one set of clamps to secure and support the apparatus during the removal process. The configuration of the apparatus suspended over the tile lessens the amount of removal force that is actually transferred to the tile. The reason the force applied to the apparatus transfers less than optimal force to the tile to be removed is because the vector of force applied is not directly behind the tile at the smallest angle of attack. This lack of efficiency renders the apparatus mainly for one time users or end users like a homeowner. The commercial operator needs quicker results and this can be accomplished by using the most efficient transfer of force.

OBJECTS AND ADVANTAGES

[0007] Some of the objects and advantages over prior art of the apparatus are as follows:

[0008] (a) to recover the separated tile intact so that it can be reset properly;

[0009] (b) to minimize the cost to the consumer by allowing one not skilled the art to accomplish the job on his own due to the lower threshold of expertise and equipment required for the job over an adhesive injection method;

[0010] (c) to provide a viable alternative to destructive method repairs;

[0011] (d) to provide an apparatus and method to more reliably recover a separated tile over the current tile removal technique utilizing hammer and chisel type hand tools.

[0012] (e) to provide an apparatus to recover a fully set tile in a closed room like a closet to replace a cracked or damaged tile in an open room like a hallway assuming both rooms have identical tile.

[0013] (f) to improve on the efficiency of force transferred to the tile to be removed resulting in a quicker removal with less effort.

DRAWING FIGS. 1-3

[0014] FIG. 1 shows the placement of the apparatus in relation to the flooring tiles in perspective view.

[0015] FIG. 2 is a top view of the apparatus.

[0016] FIG. 3 is a side view of the apparatus.

REFERENCE NUMERALS IN DRAWINGS

10 impact driver
20 impact blade
30 tension rod nut
40 guide nut support
50R guide nut
To recap, the apparatus is designed to remove a fully set tile so it can be used in another area of a floor for the purpose of replacing a cracked tile or a tile that cannot be repaired. The amount of force that is transferred to the tile with the apparatus is more efficient and allows for quicker removal of a tile with least amount of effort. The apparatus is designed to remove a partially separated flooring tile intact so that the original tile can be reset properly quickly and efficiently.

Description—FIGS. 1-3

A typical embodiment of the apparatus is illustrated in FIG. 1 with descriptive views shown in FIGS. 2 and 3. The apparatus shown in FIG. 1 is set up to remove a tile 140 and is positioned in an evacuated tile space 160 and is anchored to anchor tile 150.

The entire structure is made of a rigid material usually steel. An impact driver 10 is attached to an impact blade 20 perpendicular to each other and impact driver 10 is centrally located on impact blade 20. The thickness of impact blade 20 should be such that when the apparatus is placed in evacuated tile space 160, the top of impact blade 20 should be at least as high as the tile to be removed 140.

A guide nut support 40 is attached to impact driver 10 on the same side as impact blade 20 and is also centrally located on impact driver 10. On guide nut support 40 are attached a guide nut 50R and a guide nut 50L.

On the opposite end of impact driver 10 is an impact driver base 60 which is the same thickness as impact blade 20 is whose purpose is to level the apparatus to the tile to be removed 140. A hammer plate 70 is attached to impact driver 10 and is the part of the apparatus that is struck by a force that is used to dislodge the tile to be removed 140 from the foundation.

A tension rod nut 30 is attached to impact driver 10 on the same end as impact blade 20. Guide nuts 50R and 50L, and tension rod nut 30 connect the impact driver assembly (consisting of parts 10, 20, 30, 40, 50R, 50L, 60, and 70) to a tension clamp 80 through a tensioning rod 110, a guide rod 100R and a guide rod 100L. Attached to tension clamp 80 are a tension clamp guide 90R and a tension clamp guide 90L. Through guides 90R and 90L tension clamp 80 moves in and out from the impact driver assembly. Tension clamp 80 also slides along tensioning-rod 110 through an access for tensioning rod 120. Access for tensioning rod 120 can be at equal or lower level to tension clamp guides 90R and 90L.

A tensioning nut 130 is screwed onto tensioning rod 110 on the outer edge of tension clamp 80.

A simpler and effective embodiment could also be constructed using no guides and only a simple tensioning means to attach the impact driver assembly to the tile to be removed 140 and anchored via tension clamp 80 to the anchor tile 150. In essence only tensioning rod 110 would connect tension clamp 80 to the impact driver assembly.

As described above the apparatus allows tiles to be removed intact so that both the tile and the foundation surface can be prepared for resetting of the original tile. Multiple combinations of elements can be made to form the apparatus and the ones listed are examples of such combinations but should not be considered exhaustive.

Operation—FIGS. 1-3

First at least one tile must be removed so that the apparatus can fit into the evacuated tile space 160 adjacent to the tile to be removed 140. The removal of the tile or tiles from the evacuated tile space 160 is not done with this apparatus. The grout and any mortar surrounding the tile to be removed 140 and the anchor tile 150 must be removed. The grout should be sawed out and not chipped out because hand chipping or using a mechanical chipping tool could damage the tile prior to its removal. Grout removal is complete when the underlying foundation can be seen in the space between the tiles. One reason that complete vacency of the space is essential is because during the hammering and actual tile removal process, the tile moves forward as it breaks loose from its mortar bed and needs the space to move.

After the grout has been properly removed from around the tile to be removed 140, check it to be sure there is no grout or mortar on the side that will contact the impact blade 20. The impact driver assembly should not contact any other tiles and only the tile to be removed 140 should contact the impact blade 20 on the outside edge. An isolation membrane such as electrical tape goes between the impact blade 20 and the tile to be removed 140.

The tension clamp 80 is then opened wide enough so that it can fit into the outside edge of the anchor tile 150. The tension clamp guides 90R and 90L and tensioning rod 110 must extend past the outside edge of the tensioning clamp 80 at the point where the tensioning clamp 80 fits into the correct evacuated grout space of anchor tile 150. An isolation membrane is also placed between the tensioning clamp 80 and the anchor tile 150. The reason the anchor tile 150 is used as the point for the other half of the clamping action is because the anchor tile 150 does not move during the forceful removal process and thus provides a stable anchor for the apparatus.

Be sure that the impact blade 20 is firmly pressed to the tile to be removed and the tension clamp is square with the anchor tile 150 then check for a good fit before tightening the tension clamp 80 via the tensioning nut 130. After goodness of fit has been determined then hand-tighten the tensioning nut 130 until the apparatus is immobile on the tile to be removed 140. The clamping action that holds the apparatus in place occurs between the tensioning clamp 80 and
the impact blade 20. After checking to be sure that the apparatus is immobile on the tile to be removed 140 the removal process can begin.

[0030] Sprinkle some dirt or mortar dust on the tile to be removed to check the removal progress during hammering. As the tile is removed a wave of dirt can be seen to move from the impact blade 20 side of the tile to be removed 140 toward the opposite side of the tile to be removed 140. When this wave reaches the other side the tile will jar loose from the foundation. A heavy hammer is better than a light hammer for impacting the apparatus. A moderate amount of force should be used in series of blows to remove the tile a little bit at a time and not all at once. Trying to remove a tile in one blow will increase the chance of breaking the tile.

[0031] After the tile to be removed 140 is removed intact, it must be cleaned of old mortar. The tile can then be reset where needed. Typically tiles are removed from an isolated and private room like a closet and used to replace tiles that are cracked in common areas like hallways and kitchens where cracked tiles cannot be hidden (assuming both rooms have the same style of tile). Then for the closet where the tiles were removed, the next best matching tiles are installed. Usually the difference between the original floor and the new tiles in the closet is hard to see because of the shadows and poor lighting that are typical to a closet.

SUMMARY, RAMIFICATIONS, AND SCOPE

[0032] Accordingly, the user of the apparatus can recover fully set tiles in a private room such as a closet to replace cracked tiles in an area of the house that is open to the public where it is hard to hide a cracked tile thus keeping the floor whole and uniform. The apparatus is geared to removing multiple tiles and commercial operations because of time and cost savings due to its more efficient transfer of hammering force to the tile.

[0033] The scope of the apparatus should be determined by the appended claims and their legal equivalents, rather than by the examples given.

I claim:

1. A method for removing a portion of a grouted tile floor from the foundation comprising the steps of:
   a. removing grout and cementitious material around all sides of said tile without damaging said tile;
   b. securing an apparatus to said tile, the apparatus comprising a rigid material forming an impact driver of a predetermined size; an impact blade attached to said impact driver that fits into an evacuated tile space adjacent to said tile; a clamp that secures said impact blade to said tile, and; an impact area on said impact driver for a hammering force to be applied on said impact area used to drive said impact blade and consequently said tile forward in the same direction of the impact force;
   c. impacting the impact area to drive the tile forward.
   2. The method of claim 1, wherein removing said grout around said tile is done using a circular abrasive blade saw to cut out said grout or a drill to bore multiple holes in a series in said grout.
   3. The method of claim 1 wherein said clamp holds said impact blade firmly to said tile and uses a tensioning means to control the pressure exerted on said tile by said clamp.
   4. The method of claim 1 wherein said impact blade is secured to said tile on the side opposite said impact area through a tensioning means.
   5. An apparatus for removing a grouted floor tile comprising:
      a. a means for removing grout and cementing material around all sides of said tile without damaging said tile;
      b. a rigid material forming an impact driver of a predetermined size;
      c. a clamp that secures an impact blade to said tile that is dimensioned to fit into evacuated grout space on a side opposite said tile;
      d. said impact driver attached to said impact blade that is dimensioned to fit into an evacuated tile space adjacent to said edge of the tile opposite to said clamp; and,
      e. an impact area on said impact driver for a hammering force to be used to drive said impact blade and consequently said tile forward.
   6. The apparatus of claim 5 wherein the means for removing said grout around said tile is a circular abrasive blade saw or a drill.
   7. The apparatus of claim 5 wherein said clamp holds said impact blade firmly to said tile and uses a tensioning means to control the pressure exerted on said tile by said clamp.
   8. The apparatus of claim 5 wherein said impact blade is secured to said tile on the side opposite said impact area through a tensioning means.