

[54] **CONCRETE IMPRINTING APPARATUS AND METHOD**

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[51] Int. Cl. **E01c 23/02**

[58] Field of Search 404/89, 93, 124, 83, 133

[56] **References Cited**

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Primary Examiner—Nile C. Byers Jr.

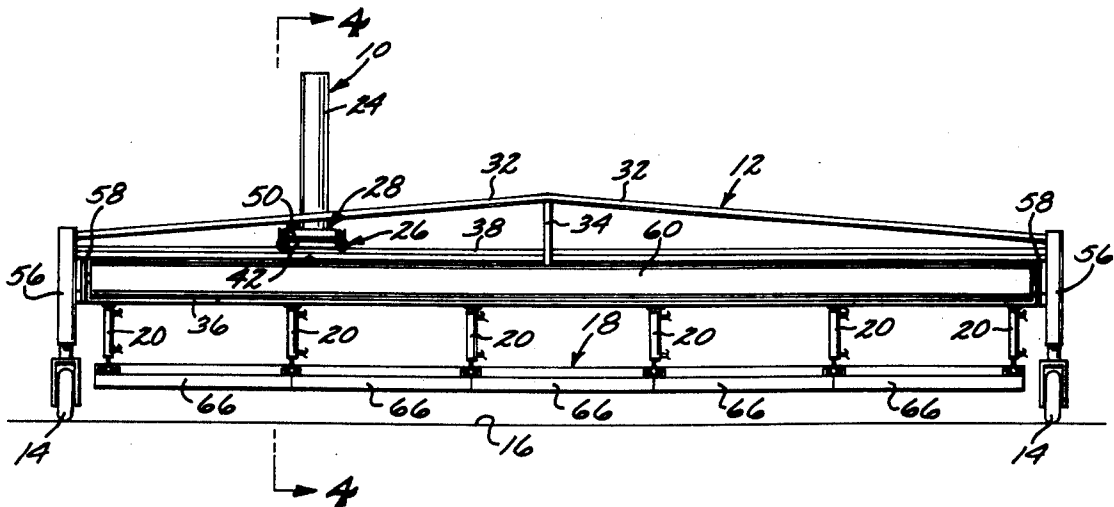
Attorney, Agent, or Firm—Fulwider, Patton, Rieber, Lee & Utecht

[57]

ABSTRACT

A concrete imprinting apparatus which includes a mobile frame positionable over a slab of partially set concrete. A carriage and cart assembly is adjustably movable on the frame and mounts an impactor which can be operated to drop under the force of gravity. Imprinting tools are suspended from the frame by fluid actuated cylinders. The imprinting method is initiated by actuating the cylinders to press the imprinting tools firmly against the concrete slab, followed by operation of the impactor so that it strikes one of the imprinting tools to drive it into the concrete. The impactor is operated at different locations until the tools are uniformly embedded. The tools are segmented to allow movement to conform to the contour of the concrete slab.

11 Claims, 10 Drawing Figures



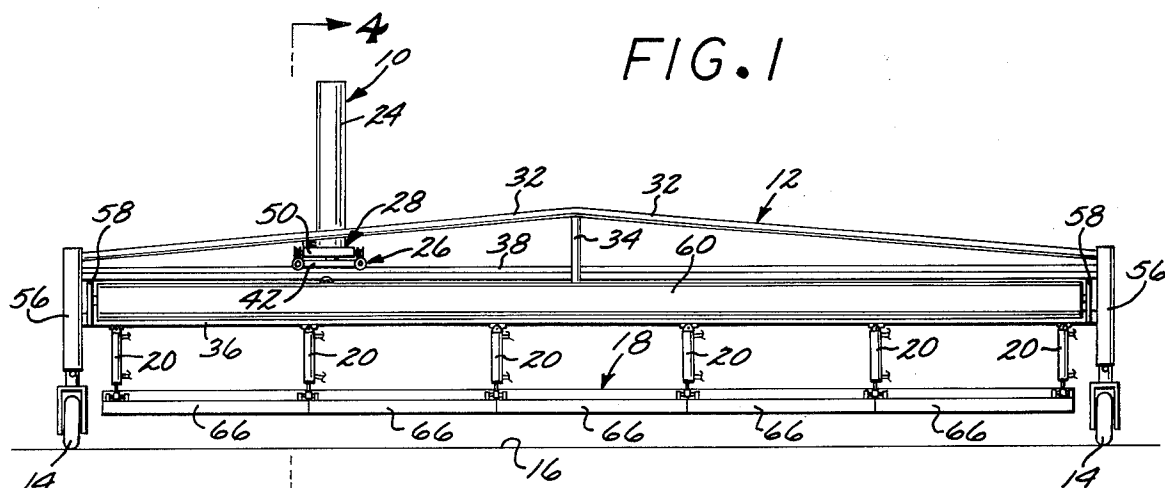
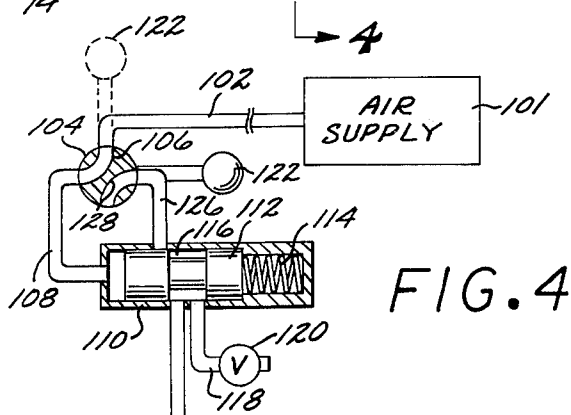
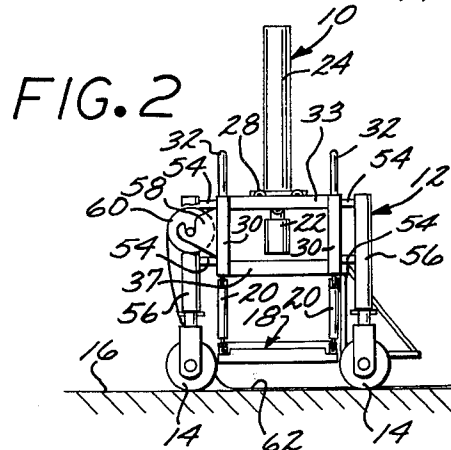
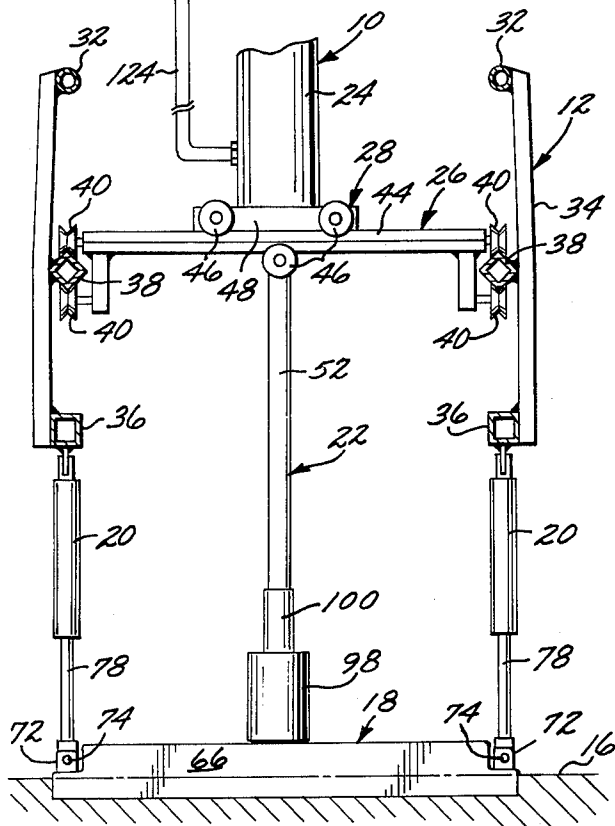
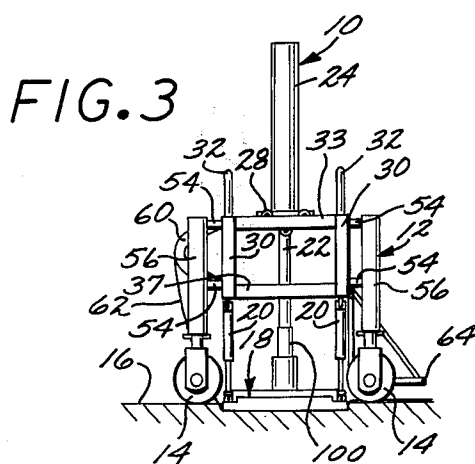


FIG. 5

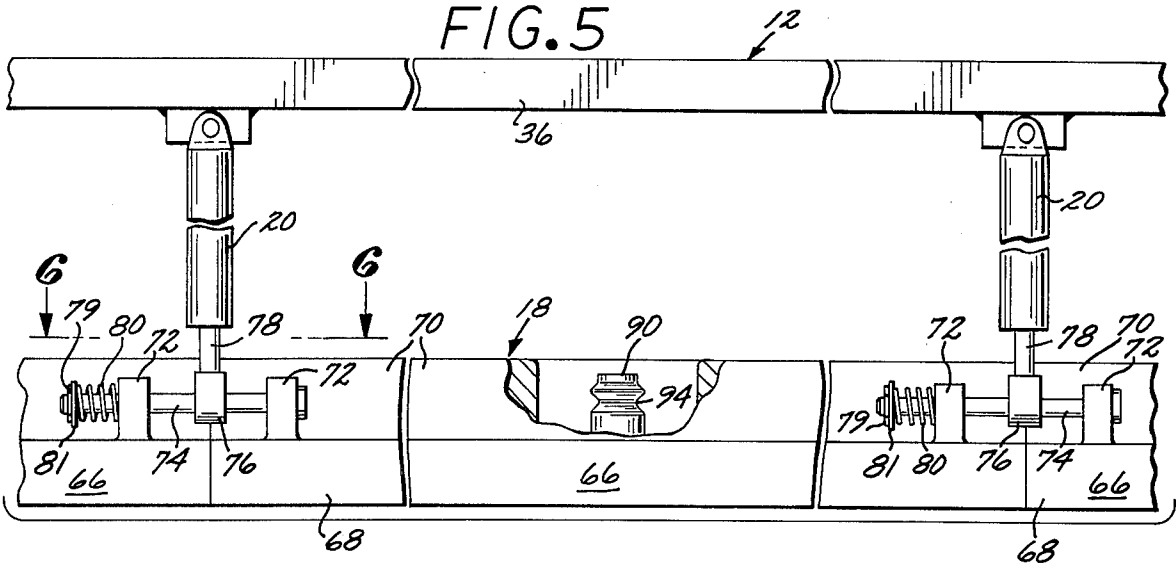


FIG. 6

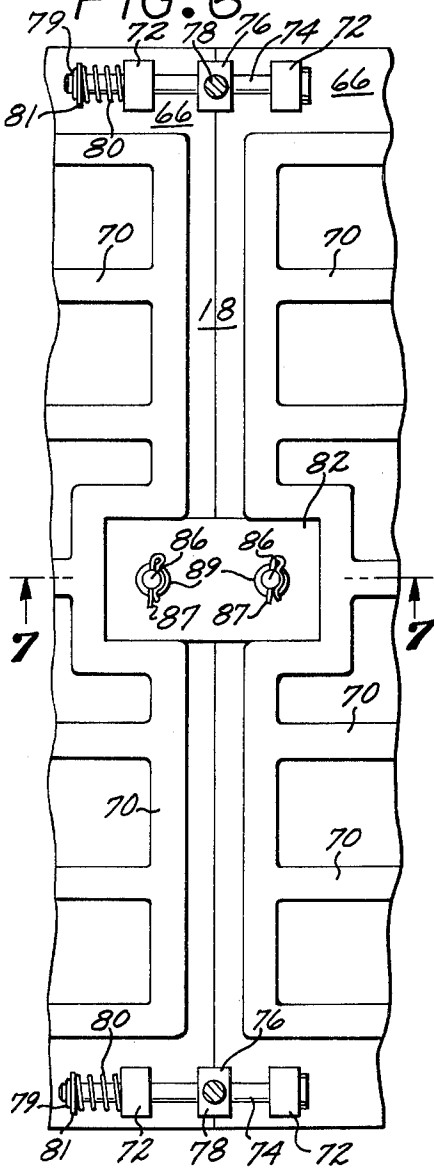


FIG. 7

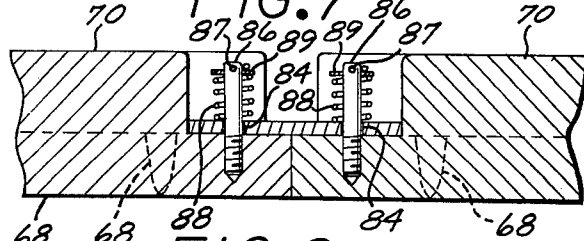


FIG. 8

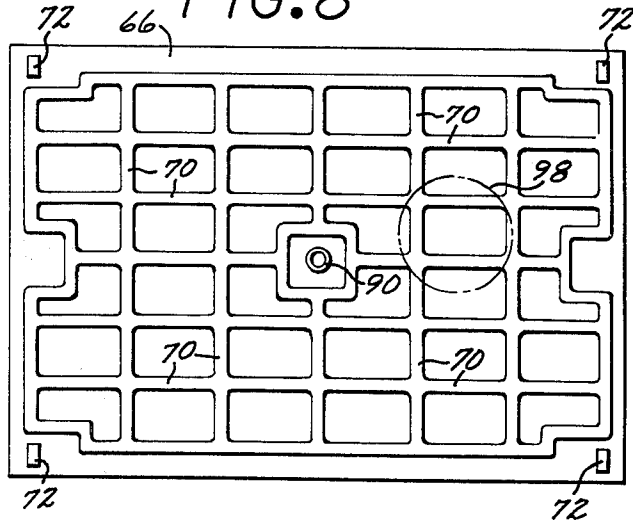


FIG. 9

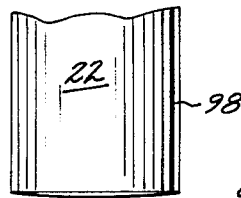
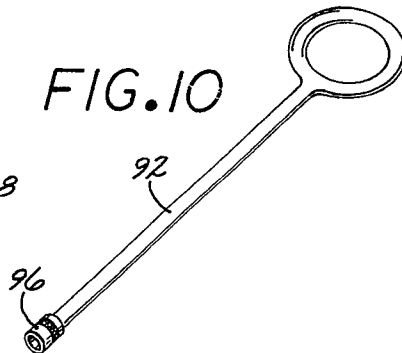


FIG. 10



CONCRETE IMPRINTING APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an apparatus and method for imprinting plastic concrete with a pattern simulating bricks, tile, cobblestones or the like.

2. Description of the Prior Art

Slabs of plastic concrete have been imprinted with grooves or patterns since as early as the year 1910, as described in U.S. Pat. No. 967,714 (Blome et al). The early imprinting methods provided only relatively rough patterns in the concrete, but recently it has become popular to imprint concrete with patterns to simulate the appearance of bricks, cobblestones, tile, or the like. One technique for accomplishing this is disclosed in U.S. Pat. No. 3,406,618 (Bowman).

Of the various known techniques for imprinting concrete, all are either relatively costly and time-consuming, or are not productive of uniform and attractive results. In those instances where machines are used to imprint at a high production rate, the imprinted pattern tends to be rough and non-uniform. Part of the reason for this is believed to be that such machines have not been able to produce the high pressing forces needed for imprinting concrete that has set or cured to the extent necessary to faithfully retain an imprinted pattern. Screw actuated means, levers, or fluid cylinders are apparently incapable of producing the desired forces without the use of very heavy frames.

Manual methods have been used with greater success to produce clear patterns, but the production rate is very slow. The imprinting tool must be located in position by hand and it covers a relatively small area. Normally the operator first walks over the entire tool or pattern to slightly embed it in the partially set concrete, and then successive portions of the pattern are struck with a sledgehammer until the pattern is embedded in the concrete to the desired depth.

SUMMARY OF THE INVENTION

According to the present invention, an imprinting apparatus is provided which produces combined pressing and impacting forces upon the tool to yield a clear pattern in partially set concrete. The apparatus includes a mobile frame which can be positioned or successively advanced over the slab which is to be imprinted. Imprinting tools are suspended from the frame by a plurality of pressing cylinders which are fluid actuated to urge the tools against a plastic sheet laid on top of the concrete slab. The cylinders press the tools into the concrete with sufficient force to partially embed them.

The tools are preferably abutting separate elements or segments connected in articulated fashion so that they are independently movable to conform to the contour of the upper surface of the concrete slab.

Each tool includes a grid of upwardly projecting reinforcing ribs adapted to be struck by a weighted impactor. A carriage and cart arrangement mounts a fluid actuated impactor raising cylinder and is operative to locate the cylinder above any part of the tools. Fluid under pressure applied to the cylinder raises the impactor. Sudden release of this pressure allows the impactor to fall of its own weight and strike the tool means. This cycle is repeated until the desired pattern is formed.

The pressing forces provided by the foregoing arrangement uniquely align the tools in firm engagement conformably to the slab contour. The kinetic force of the falling impactor is great enough to progressively embed the tools to the desired depth and, since the impactor weight and raised height are constant, the kinetic force is uniform for every impact. Also, if an obstruction such as a stone impedes penetration of the slab by a tool, the tool is not automatically subjected to greater impact forces by the present apparatus. Instead, the absence of embedment indicates to the operator the presence of an obstruction which must be cleared away.

Other objects and features of the invention will become apparent from consideration of the following description taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a concrete imprinting apparatus according to the present invention;

FIG. 2 is a side elevational view of the apparatus of FIG. 1, with the tools and impactor in their upper positions;

FIG. 3 is a view similar to FIG. 2, but illustrating the tools and the impactor in their downward positions;

FIG. 4 is an enlarged view taken along the line 4—4 of FIG. 1;

FIG. 5 is a partial view of adjacent tools of the tool assembly, portions being foreshortened to conserve drawing space, illustrating interconnection and suspension of the tools from the pressing cylinders;

FIG. 6 is an enlarged view taken along the line 6—6 of FIG. 5;

FIG. 7 is a view taken along the line 7—7 of FIG. 6;

FIG. 8 is a top plan view of one of the tools of the tool assembly;

FIG. 9 is an enlarged side elevational view of the bottom portion of the impactor; and

FIG. 10 is a lifting tool for manually lifting individual tools of the tool assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIGS. 1—4, there is illustrated a concrete imprinting apparatus 10 comprising, generally, a frame 12 including tires or wheels 14 operative to position the frame 12 over a slab 16 of partially set or cured concrete; an imprinting tool assembly 18 suspended from the frame 12; a plurality of pressing cylinders 20 carried by the frame 12 and actuable to urge the tool assembly 18 into pressing engagement with the slab 16; an impactor 22; an impactor raising cylinder 24 supporting the impactor 22 and actuable to release the impactor 22 to fall of its own weight into striking engagement with the tool assembly 18; and a locating system for the impactor cylinder 24 and impactor 22, including a carriage 26 adapted to move longitudinally of the frame 12 and a cart 28 mounting the impactor cylinder 24 and adapted to move along the carriage 26 transversely of the frame so that the position of the impactor 22 can be adjusted relative to the tool assembly 18.

The frame 12 is an open framework, box-like structure usually oriented with its longest or longitudinal dimension in spanning relation to the slab 16. The frame 12 includes upright corner posts 30 whose upper ex-

tremities are connected together by inclined, longitudinally oriented braces 32 welded together at their adjacent ends at the middle of the frame 12, and by front-to-rear or transversely oriented members 33. The lower extremities of the corner posts 30 are secured together by longitudinally extending support elements 36, and by transversely extending support elements 37. In addition, the juncture of each pair of diagonal braces 32 is welded to the top of a center post 34 whose lower end is welded to the adjacent support element 36, as seen in FIG. 4.

As best viewed in FIGS. 1 and 4, the support elements 36 pivotally support the upper ends of the plurality of pressing cylinders 20, preferably six along the front side of the frame 12 and six along the rear side of the frame 12. The lower extremities of the piston rods of the pressing cylinders 20 are pivotally connected to the tool assembly 18, as will be seen.

A pair of transversely spaced apart, longitudinally extending carriage rails 38, preferably made of square tubing or the like, are welded at their middle to the center posts 34 and at their ends to the corner posts 30. Each rail 38 is arranged with opposite corners upwardly and downwardly oriented to form a track to receive a pair of grooved wheels 40 on its upper corner, and a single grooved wheel 40 on its lower corner, all of the wheels 40 being suitably attached to the carriage 26.

The carriage 26 is generally rectangular, including elongated front and rear members 42 joined at their ends to a pair of end members or cart rails 44. Each rail 44, like the rails 38, is preferably made of square tubing with its corners serving as tracks for grooved wheels 46 carried by the cart 28. A pair of the wheels 46 ride on the upper corner of each rail 44, with a single wheel 46 riding on the lower corner of each rail 44.

The cart 28 is generally rectangular, comprising elongated side members 48 and elongated end members 50 which support a central plate (not shown) to which the lower extremity of the impactor cylinder 24 is rigidly secured. The plate is provided with a central opening (not shown) through which the rod 52 of the impactor cylinder 24 is disposed for reciprocal vertical movement, as will be seen.

With the foregoing arrangement, the carriage 26 is longitudinally movable along the length of the frame 12 by rolling on its wheels 40 along the carriage rails 38. In similar fashion, the cart 28 is transversely movable between the front and rear of the frame 12 by rolling on its wheels 46 along the cart rails 44.

A pair of horizontally oriented, vertically spaced apart support members 54, as seen in FIGS. 2 and 3, are welded at their inner ends to each frame corner post 30. The outer ends of each pair of members 54 are welded to and support a vertically oriented wheel mount 56 which rotatably carries one of the frame wheels 14. As will be apparent to those skilled in the art, the wheels 14 are vertically adjustable within the wheel mounts 56 by any suitable means to adjust the height of the frame 12 above the slab 16.

The wheels 14 enable the apparatus 10 to be located in any desired position over the slab 16, and further enable the apparatus 10 to be progressively advanced over the slab 16 to form the desired imprints in the slab 16. Large expanses of concrete can be relatively quickly imprinted with the apparatus 10 because of this easy mobility.

The corner posts 30 at the front side of the frame 12, as viewed in FIG. 1, mount a pair of roll support brackets 58 which include upwardly opening slots for receiving the opposite ends of a shaft on which a roll 60 of plastic film is mounted. As best seen in FIGS. 1 and 2, the shaft of the roll 60 is rotatable upon the brackets 58 so that a sheet 62 of the plastic film can be unrolled and arranged below the tool assembly 18, between the frame wheels 14, and in overlying relation to the slab 16 to be imprinted.

The opposite or rear side of the frame 12 is preferably provided with a longitudinally extending work platform 64 whose upper portion is attached to the adjacent frame support element 36, and whose lower portion is attached to the adjacent wheel supports 56. The platform 64 is used to support the weight of workmen operating the apparatus 10 and inspecting the imprinting done by the apparatus 10.

The imprinting tool assembly 18 comprises a plurality of generally rectangular tools, patterns, or tool segments 66 arranged in adjacent relation along the length of the frame 12, with their adjacent margins abutting, as best viewed in FIGS. 1 and 5-7.

Each tool segment 66 includes a plurality of downwardly oriented blades 68 arranged in a grid-like pattern to provide whatever effect is desired, such as simulated brick, cobblestone, tile or the like. The blades 68 are each characterized by a V-shaped or slightly rounded lower edge to facilitate pressing of the plastic sheet 62 into the slab 16 during the imprinting operation. Such plastic sheeting is known in the art and is preferred for use with the present method because it tends to prevent the slab from cracking, crumbling or spalling during imprinting of the slab. It is particularly helpful where a cobblestone pattern is to be imprinted. In addition, the plastic sheeting has the important property of keeping concrete from coming into contact and accumulating upon the blades 68. This makes it unnecessary to specially configure the blades 68 to keep the concrete from sticking to the blades.

The blades 68 are integral at their upper extremities with a grid of interconnected, upwardly projecting ribs 70 of substantial cross-section to withstand impact forces created by the falling impactor 22. The upper edges of the ribs 70 are flattened to facilitate hammering them with the impactor 22, as will be seen.

The adjacent margins or sides of the tool segments 66 are connected together in such a way that they are slightly movable relative to one another, both up and down and horizontally. This is accomplished by connecting means which comprise an integral mounting tab 72 at each of the four corners of each tool segment 66. The tabs 72 at adjacent corners of each pair of adjacent tool segments confront one another and are provided with horizontally oriented openings which receive the shanks of headed pins 74. The opening in each tab 72 is relatively large compared to the diameter of the shank of the pin 74 to allow a degree of relative movement therebetween.

Each pin 74 also passes through an opening provided in a connector 76 attached to the lower end of the piston rod of one of the pressing cylinders 20.

The shank end of each pin 74 includes a transverse opening which receives a cotter pin 79 to hold a washer 81 in position. A compression spring 80 is disposed between the washer 81 and an adjacent tab 72. With this arrangement, each pair of adjacent tool segments 66

are urged together by the action of the springs 80. However, since the yieldable spring connections and the generous clearances about the pins 74 allow relative movement, both vertically and horizontally, the tool segments 66 are able to individually conform to a crowned or non-planar slab 16. Because of this capacity to conform to differences in slab elevation, the tool segments 66 are able to provide a distinct and attractive pattern in the plastic concrete of the slab.

The foregoing uniformity of pattern imprintation is enhanced by the location of the connector 76 and pin 74 connections at each of the four corners of the various tool segments 66, as seen in FIGS. 6 and 8. This allows the vertical center line of each of the pressing cylinders 20 to be generally aligned with the joint between adjacent tool segments 66. Consequently, the pressing force developed by each of cylinders 20 is exerted substantially equally the adjacent tool segments 66 suspended from the cylinders 20. The various pressing cylinders 20 are preferably interconnected to a common air pressure source (not shown) whereby each cylinder is moved downwardly with approximately the same air pressure. This also tends to produce greater uniformity of pattern imprintation.

Each pair of adjacent tool segments 66 are also connected at the mid-points of their adjacent margins by a connecting strap 82, as seen in FIGS. 7 and 8. The grid-like pattern of the ribs 70 is arranged to provide a recessed area to receive the strap 82. The ends of the strap include a pair of end openings 84 sufficiently large to accommodate a pair of vertically oriented pins 86 with generous clearances. The lower extremities of the pins 86 are threaded into the associated tool segments 66, and their upper extremities include transverse openings for cotter pins 87. Each pin 87 anchors a washer 89 in position, and a compression spring 88 is fitted between the washer 89 and the adjacent upper surface of the strap 82. The springs 88 and the generous clearances between the pins 86 and the margins of the openings 84 allow the aforementioned desired relative movement between the adjacent tool segments 66.

The upper ends of the tabs 72 and pins 86 are recessed below the upper flattened surfaces of the ribs 70 so that they are protected from possible damage by the falling impactor 22.

As best seen in FIGS. 5 and 8, an upwardly projecting stud 90 is located centrally of each tool segment 66, integral therewith, and is adapted to be coupled to the lower end of a lifting rod 92. As seen in FIG. 10, the rod 92 includes a ring-shaped handle at one end for lifting, while its opposite end includes a usual and conventional quick-disconnect sleeve 96. The stud 90 includes an annular groove 94 and, as will be apparent to those skilled in the art, the rod 92 can be quickly connected and disconnected from the stud 90 by axially moving the sleeve 96 to move a locking ball (not shown) into and out of seating and locking engagement within the groove 94. This type of quick-disconnect fitting is common on hydraulic hoses and the like. With this arrangement it is possible to manually lift each of the tool segments 66 for transport and storage or the like, once the tool segment is demounted from the rest of the apparatus 10.

The upper terminus of the stud 90 is also located below the upper surfaces of the ribs 70 to protect it from possible damage by the impactor 22.

The impactor 22 includes a relatively heavy weight 98, weighing perhaps 65 to 70 pounds, connected by a rubber or elastomeric cylinder 100 to the lower end of the piston rod of the impactor cylinder 24. The lower end of the weight 98 is preferably slightly convex and is characterized by a diameter large enough to span the space between adjacent ribs 70, as indicated in phantom outline in FIG. 8, so that it cannot pass between the ribs and strike the slab 16.

The impactor cylinder 24 is operated by fluid under pressure, preferably compressed air, derived from a suitable pressure source 101, such as a compressor and compressed air tank (not shown). The system for supplying compressed air to the cylinder 24 and exhausting it therefrom is shown schematically in FIG. 4. In actual practice the valving components would be mounted on the impactor cylinder 24 for convenience.

Compressed air is supplied through a conduit 102 to a handle valve 104 having an actuating handle 122 which is movable by the operator from the full line or "down" position illustrated in FIG. 4, to the dotted line or "up" position.

In the "down" position of the handle 122, compressed air passes through a passage 106 in the valve 104 and through a conduit 108 to a spool valve 110. The air forces the spool 112 to the right, as viewed in FIG. 4, against the bias of a compression spring 114, to allow compressed air in the impactor cylinder 24 to escape through a conduit 124, through a valve space 116 in the valve 110, through a conduit 118, and through a metering valve 120 to atmosphere. This allows the impactor weight 98 to fall under the force of gravity. The rate of falling can be adjusted by adjusting the metering valve 120, as will be apparent, to adjust the rate of escape of the compressed air from the cylinder to thereby adjust the rate of descent of the weight 98.

In the "up" position of the handle 122, the spool 112 is urged to the left by the spring 114, and air trapped on the left side of the spool 112 is vented through the conduit 108 and the valve passage 106 to atmosphere. The biased location of the spool 112 to the left blocks any passage of compressed air past the metering valve 120 to atmosphere. Instead, compressed air from the air supply 101 passes through the conduit 102, through a now aligned valve passage 128 in the valve 104, through the conduit 126, and into the valve space 116. From this point the compressed air passes through the conduit 124 to the underside of the piston (not shown) located within the impactor cylinder 24 to raise the impact weight 98 from the position illustrated in FIG. 3 to the position illustrated in FIG. 2.

The particular valve system just described is merely exemplary, and alternative arrangements for raising the weight 98, and subsequently releasing it, will suggest themselves to those skilled in the art. The present invention comprehends the utilization of such alternate, equivalent arrangements.

In operation, the impacting tool assembly 18 and impactor 22 are raised, and the apparatus 10 is rolled on its wheels 14 adjacent the edge of the slab 16 to be imprinted. If, for example, the imprinted pattern is intended to simulate cobblestones, tool segments 66 having that type of blade arrangement and configuration are mounted to the pressing cylinders 24 in suspended relation beneath the frame 12.

The present method next includes the step of unrolling a sheet 62 of plastic material from the roll 60 until

it underlies the imprinting tool assembly 18, as best illustrated in FIG. 2. The operator, by suitable valving (not shown) then causes compressed air to be applied to the pressing cylinders 20 to move the blades 68 of the tool assembly 18 from the position of FIG. 2 to that of FIG. 3, against the plastic sheet 62 and partially into the upper portion of the slab 16.

The force applied by the cylinders 20 upon the assembly 18 is such that the weight of the frame 12 is perceptibly transferred from the wheels 14 of the frame 12 to the imprinting tool assembly 18. Slight surface irregularities, such as a crown or the like exist in most slabs 16, and the tool assembly 18 of the present invention is adapted to accommodate itself to irregular slab contours by reason of the articulated interconnections of the tool segments 66 at their abutting edge margins, as previously described. The resulting close conformity of the tool segments 66 to the slab contour is productive of clear, precise, and uniform imprintation patterns in the plastic concrete, in combination with the operation of the impactor 22.

In this regard, the raised impactor 22 is ready to be dropped at this time. The operator accomplishes this by movement of the valve handle 122 from the "up" or dotted line position of FIG. 4 to the "down" or full line position. However, just prior to doing this the operator first moves the carriage 26 and cart 28 until the impactor weight 98 is located above the point on the particular tool segment 66 that is to be struck. He then pulls the valve handle 122 down, which quickly vents compressed air from the cylinder 24, allowing the impactor weight 98 to rapidly fall and strike against the ribs 70 of the tool segment 66. As previously indicated, the rate of falling is controlled to some extent by adjustment of the metering valve 120.

Next, the impactor weight is raised by moving the handle 122 to the "up" or dotted line position illustrated in FIG. 4. As discussed above, this allows air to vent from the spool valve 110, permitting the spool 112 to move to a position which blocks venting of compressed air from the impactor cylinder 24. Contemporaneously, this routes compressed air to the underside of the piston of the cylinder 24 and raises the impactor weight 98 to its uppermost position, as illustrated in FIG. 2.

The foregoing operation or cycle is repeated until the impactor 98 has been allowed to fall upon various selected points on the tool segments 66 to an extent that the blades 68 of the tool segments 66 are uniformly embedded in the concrete slab 16 to the depth productive of the desired imprinting effect.

After the complete expanse of the slab 16 underlying the tool assembly 18 has been imprinted, the impactor 22 and imprinting tool assembly 18 are raised, and the whole frame 12 is indexed or rolled on its wheels 14 to the next adjacent portion of the slab 16. This automatically unrolls a fresh section of plastic sheet 62. The operational cycle is repeated until the complete expanse of the slab 16 is imprinted. The used or embedded plastic sheet 62 is pulled out of the slab imprintations in any convenient manner as the operation proceeds, such as by workmen standing upon the platform 64. Such workmen simply pull up upon and collect the used plastic sheet as the apparatus 10 advances forwardly, that is, to the left as viewed in FIG. 2.

Any suitable indexing or matching means may be utilized to insure that the imprintation patterns of succes-

sive positions of the apparatus 10 are properly matched to produce the desired continuous imprintation pattern, as will be apparent.

Thus, utilizing the apparatus and method of the present invention, it is possible to quickly and relatively inexpensively produce a uniform and clear pattern in relatively large expanses of concrete. Hand labor and manual embedment of the imprinting tools is completely eliminated. Moreover, use of the pressing cylinders 20 firmly seats the imprinting tools upon the concrete slab so that the impacting forces provided by the impactor 22 are not dissipated, nor is the slab chipped or spalled, by vibration or bouncing of the tool segments 66. Also, since the weight of the impactor weight 98 and the distance through which it falls can be maintained relatively constant, as can the adjustment of the metering valve 120, the impact blows are generally uniformly repeatable. Consequently, the imprinted pattern tends to be much more uniform than those obtained with the methods and apparatus of the prior art.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention.

I claim:

1. A concrete imprinting apparatus comprising:

a frame including means operative to position said frame over a slab of partially set concrete;
imprinting tool means, including a plurality of interengaged tool segments located in adjacent relation and movable relative to one another to conform to the contour of a non-planar slab of concrete, said tool segments each including upwardly projecting impact sections;

a plurality of pressing means carried by said frame and actuable upon said plurality of tool segments, respectively, at points other than said impact sections to urge said tool segments into pressing engagement with said concrete;

an impactor;

impactor raising means supporting said impactor and actuable to release said impactor to fall under the force of gravity for striking said impact sections of said tool means; and

locating means carried by said frame and operative to adjust the position of said impactor relative to said tool means.

2. A concrete imprinting apparatus according to claim 1 wherein said impact sections comprise a plurality of upwardly projecting reinforcing ribs adapted to be struck by said impactor.

3. A concrete imprinting apparatus according to claim 1 and including coupling means yieldably connecting the margins of said tool segments whereby said tool segments are characterized by a capability for yieldable movement relative to one another to conform to the contour of said slab of concrete.

4. A concrete imprinting apparatus according to claim 3 wherein said pressing means are operative, respectively, upon certain of said connecting means whereby the urging of each said pressing means is operative upon adjacent margins of a pair of said tool segments.

5. A concrete imprinting apparatus according to claim 3 wherein said impact sections comprise a plurality of upwardly projecting reinforcing ribs adapted to be struck by said impactor, said ribs terminating above the level of said coupling means.

6. A concrete imprinting apparatus according to claim 2 wherein said tool segments each includes an integral, centrally located fitting terminating below the upper termini of said ribs and adapted to receive a lifting tool for manually lifting the associated said tool segment.

7. A concrete imprinting apparatus according to claim 1 wherein said locating means includes a carriage movable in one direction on said frame, and a cart movable on said carriage in a direction transversely of said one direction, and wherein said impactor raising means are supported upon said cart.

8. A concrete imprinting apparatus according to claim 1 wherein said impactor raising means comprises an air cylinder adapted to receive air at one extremity to raise said impactor, and valve means actuable to exhaust said air and allow said impactor to fall.

9. A concrete imprinting apparatus according to claim 1 and including roll mounting means on said frame for dispensing plastic film for location below said tool means in overlying relation to a slab of partially set concrete.

10. A concrete imprinting apparatus comprising:
an elongated frame including means operative to position said frame over a slab of partially set concrete;
imprinting tool means including a plurality of abutting, generally rectangular tool segments, and coupling means providing articulated connections between adjacent tool segments for conformity thereof to a concrete slab of non-planar contour;
a plurality of fluid actuated pressing cylinders carried

by said frame, supporting said tool means, and actuable upon said plurality of tool segments, respectively, to press said tool means against the underlying slab of concrete;

an impactor;
a carriage on said frame and movable longitudinally thereof;

a cart on said carriage and movable thereon transversely of said frame; and

a fluid actuated impactor cylinder supporting said impactor, adapted to receive fluid under pressure to raise said impactor, and actuable to exhaust said fluid and allow said impactor to fall of its own weight onto said tool means.

11. A method of imprinting a slab of partially set concrete comprising the steps of:

arranging a sheet of flexible plastic film in overlying relation to the slab;

placing a plurality of interconnected, independently movable tools on said film in edge abutting relation;

pressing said tools firmly against the upper surface of said slab to effect conformity of said tools with the contour of said upper surface;

repeatedly raising a weighted impactor above said tools, and releasing said impactor to fall of its own weight onto different portions of said tools to drive said tools further into the concrete slab, while continuing to press said tools against said concrete slab.

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