

SELF-CLEANING FLOORING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application is a continuation-in-part of co-pending United States Application Serial No. 10/282,393, filed October 29, 2002, and co-pending U.S. Application Serial No. 11/074,814, filed March 8, 2005, the entire contents of which are hereby incorporated by reference.

10 STATEMENT RE: FEDERALLY SPONSORED RESEARCH/DEVELOPMENT
 Not Applicable

BACKGROUND

15 The present invention relates generally to flooring protection and, more particularly, to a self-cleaning flooring system having modules which are interconnectable to horizontally adjacent modules to form a continuous flooring system for catching waste products in a variety of applications and industries including, but not limited to, laundry facilities and food preparation facilities. The flooring system of the present invention may also be formed as a permanent
20 installation that is cast in a concrete floor using removable male mold inserts that duplicate the shape of a drain pan and over which floor grids may be installed for supporting personnel standing thereupon.

 Advantageously, the flooring system of the present invention is adapted for use in dairies, meat processing plants, stables, poultry operations, machine shops,
25 clean assembly rooms, printing facilities, and food processing plants. Furthermore, the flooring system of the present invention may be used in transition areas in animal processing applications. For example, the flooring system of the present invention may be used between a feed yard and dairy milking stations wherein hooves of livestock passing over the flooring system could be sprayed prior to entering the dairy
30 milking station such that undesirable residue (e.g., manure) may be washed from the livestock hooves and into the flooring system for later retrieval as fertilizer.

 In many industries, cleanliness of certain facilities and rooms is critical. For example, in the food preparation industry, sanitation and cleanliness in the kitchen is a

major concern. The kitchen flooring in restaurants, hotels, institutions, and commercial food vending facilities in general is subject to frequent spillage from waste products. Such waste products may be in the form of spilled liquids, semi-solids, and small solids and may include grease, oil, water, and an infinite variety of food products. Spilled waste products may create a sanitation hazard as a hot kitchen is a natural breeding ground for harmful bacteria that may be caught in tile grout, and around pipes, drains or other kitchen fixtures. Because of the immovable nature of such kitchen fixtures, cleanliness is difficult if not impossible to maintain. Stringent health codes in most states require that kitchens in commercial food vending facilities receive daily cleaning.

Daily cleaning of walls, counter tops, appliances and floors involves a great deal of hand labor consuming a considerable amount of time. In addition, the waste products may create a health hazard in that spilled food products are often wet or sticky, creating a high risk that kitchen personnel may be injured in a fall. Furthermore, spilled grease or oil creates a fire safety hazard requiring the cessation of all operations in the kitchen until the grease or oil is removed from the floor. As may be expected, shutting down all kitchen operations in a restaurant or hotel may result in a significant loss of revenue. In addition, current cleaning methods of facilities such as commercial kitchens may entail the temporary removal and/or dismantling of certain equipment and flooring systems followed by lengthy washing with water. As may be appreciated, such cleaning methods results in the use of large quantities of water which may increase water conservation issues in certain locales.

There is currently known in the prior art flooring systems that are configured to address sanitation and safety concerns. One prior art device comprises a washable floor for collecting waste. The device provides a grid or mesh on which a person may stand, the grid mounted above a sub-floor onto which waste falls. The sub-floor is downward sloping towards a drain outlet. Flushing means are provided for flushing the fluid waste down the sub-floor towards the drain outlet. The grid is pivotably movable between a horizontal position and a vertical position and is removable to facilitate maintenance. Although the device addresses a few safety and sanitation issues mentioned above in that it provides a disposal means for fluid waste, the device lacks installation flexibility in that it must be custom fitted to a particular floor configuration. In addition, the size of the grids and sub-floor are such that these

components are too heavy and too large to be individually washed, either by hand or by mechanical means, such as in a commercial dishwasher.

Another prior art device provides a supporting surface for personnel standing thereupon. The device allows water or fluid to flow through the supporting surface and underneath a modular flooring member. The device includes a series of cross-channels forming a gridwork of fluid pads which permit water to flow underneath the modular flooring. However, a major drawback to the device is that a large portion of the subsurface of the flooring member is in direct contact with the moist support floor. Although this device addresses some safety concerns in that it provides a non-slip surface upon which personnel may stand, the device is subject to the problems of mildew and degradation of the subfloor arising from captured water. Furthermore, the device is not configured to be easily washable by hand or by mechanical means. Finally, the above-mentioned devices require the use of large amounts of water for thorough cleaning thereof.

As can be seen, there exists a need in the art for a flooring system for catching waste products that also provides a non-slip surface upon which personnel may stand to reduce the risk of injury from slipping. Furthermore, there exists a need in the art for a flooring system that is self-cleaning such that waste products may be flushed toward a drain outlet for subsequent disposal. Additionally, there exists a need in the art for a flooring system that is light weight and of small size such that it is removable for easy cleaning by hand or with cleaning equipment such as a commercial dishwasher as may be found in a commercial kitchen.

Also, there exists a need in the art for a flooring system that is modular such that individual modules may be interconnected to cover a desired area in a variety of applications and industries including, but not limited to, laundry facilities and food preparation facilities such as a cooking line in a commercial kitchen. Finally, there exists a need in the art for a flooring system that may be permanently molded into a concrete floor using removable male mold inserts that duplicate the shape of a drain pan and over which floor grids may be installed for supporting personnel standing thereupon. Such a flooring system may be used in various industries including, but not limited to, dairies, stables and meat processing plants.

BRIEF SUMMARY

The present invention specifically addresses and alleviates the above referenced deficiencies associated with flooring systems. More particularly, the present invention is an improved self-cleaning flooring system for catching waste products. In one embodiment, the flooring system is modular and is configured such that it may be cleaned using cleaning equipment that is typical of the industry wherein the flooring system is installed. For example, if the flooring system is installed in a commercial kitchen, the flooring system is adapted to be cleaned using commercial dishwashing equipment. In another embodiment, the flooring system may be cast-in-place into a concrete substrate using foam inserts such that upon curing of the concrete, removal of the foam inserts, installation of plumbing, and laying of floor grids, a durable flooring system is provided.

In accordance with an embodiment of the present invention, there is provided a self-cleaning flooring system for catching waste products. The flooring system has at least one module comprised of a drain pan and a floor grid. The drain pan includes a pair of ramps and a drain channel centrally located between the ramps. The drain pan may include a pair of side walls and a pair of end walls. The ramps are disposed on opposite sides of the drain channel and slope downwardly towards the drain channel. The drain channel extends between the end walls and slopes downwardly from one end of the drain pan toward an opposite end of the drain pan toward a drain outlet. The side and end walls collectively form a periphery of the drain pan and extend upwardly from the ramps and drain channel to enclose the drain pan. The side walls and/or ramps have at least one, and, preferably, a plurality of discharge mechanisms such as discharge ports and/or spray nozzles for releasing flushing fluid onto the ramp such that waste products that fall onto the ramps are washed toward the drain channel.

The floor grid is configured to support personnel and/or animals standing upon or moving thereacross while permitting waste products to pass therethrough. The side wall may include a hollow passage having a fluid inlet whereby flushing fluid may be delivered to the discharge ports. The fluid inlet of adjacent ones of the modules also allows for the flushing fluid to flow therebetween. The end most one of the modules may be connectable to the flushing fluid source. The fluid inlet may be connected to a fluid supply wherein flushing fluid is delivered to the hollow passage. An overflow

passage may be provided near the drain channel for allowing the flow of flushing fluid and/or liquid waste products between adjacent modules. The floor grid may comprise a plurality of abutting floor grids disposed parallel to one another. The floor grids are sized such that the length of the module matches the combined length of the abutting floor grids. The module may include a plurality of dowels with the side walls having complimentary apertures sized for receiving the dowels for interconnecting the modules.

The desired number of drain pans are assembled horizontally and joined using dowels or other suitable means. The fluid inlets are connected to the flushing fluid source. During use, the flushing fluid flows from the fluid inlets into the drain pans. The flushing fluid may be provided on a periodic basis through the use of a timed control valve. Alternately, the flushing fluid may be manually provided as desired when the accumulation of waste products on the ramps reaches a critical level. Additionally, a thermal sensor may operate to provide the flushing fluid to the fluid inlet in the case of a fire. The flushing fluid may be in the form of water from a tap water source, and is discharged out of the discharge ports. The flushing fluid may be pressurized and the flushing fluid may include additives such as degreasers to facilitate breakdown of certain food substances.

Waste products that fall through the floor grid are washed by the flushing fluid down the ramps toward the drain channel. Once in the drain channel, the flushing fluid then washes the waste products toward the drain outlet. Removable strainer trays may be used over the drain channel to prevent waste products from entering the drain channel. Drain baskets may be installed over the drain outlet to prevent waste products from washing down the drain outlet. Floor grids may be installed over the drain pan to support personnel standing or working above the drain pans. The floor grids are preferably sized and configured to prevent waste products of a predetermined size from entering the drain pan.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which like numbers refer to like parts throughout, and in which:

Figure 1 is a perspective view of a first embodiment of a flooring system illustrating the connective relationship of horizontally adjacent modules that may make up the flooring system;

5 Figure 2 is an exploded perspective view of the flooring system of Fig. 1 illustrating a module and the relationship of a drain pan and floor grids that make up the module;

Figure 3 is a longitudinal sectional view of the module taken along line 3-3 of Fig. 1 illustrating ramps sloping downwardly toward a drain channel;

10 Figure 4 is an enlarged partial sectional view of the module taken from Fig. 3 illustrating the connective relationship of a spray nozzle disposed within a side wall of the module;

Figure 5 is a transverse sectional view of the module of the first embodiment taken along line 5-5 of Fig. 1 illustrating the drain channel sloping downwardly toward a drain outlet;

15 Figure 6 is a perspective view of a second embodiment of the flooring system illustrating the connective relationship of floor grids and horizontally adjacent drain pan sections that make up a drain pan assembly;

20 Figure 7 is an exploded perspective view of the flooring system of Fig. 6 illustrating the connective relationship of a first and a second ramp section with a channel section that make up the drain pan section of the second embodiment;

Figure 8 is a block diagram of a pressure tank and timer connected to the modules of the present invention;

25 Figure 9 is a perspective view of the flooring system wherein the drain pan includes a drain channel that is singly-sloped toward the drain outlet located at one end of the drain pan;

Figure 10 is a cross-sectional view of the module taken along line 10-10 of Figure 9 and illustrating a the drain pan installed in a concrete substrate wherein the drain pan includes a perimeter flange formed about a periphery of the drain pan to support the drain pan;

30 Figure 11 is a top view of the module shown in Figure 9 illustrating an arrangement of the spray nozzles installed in the ramps;

Figure 12 is a side view of the module of Figure 9 illustrating the drain channel sloping from one end of the drain pan to the other toward the drain outlet;

Figure 13 is a partial cross sectional view of the flooring system in a further embodiment wherein the drain pan is cast-in-place into a concrete substrate and illustrating a manifold disposed above one of the ramps and to which spray nozzles may be fluidly connected;

5 Figure 14 is a schematic diagram of a plumbing system in an embodiment wherein the plumbing system is interconnected to a series of spray nozzles installed in a single section of the flooring system; and

10 Figure 15 is a schematic diagram of a plumbing system in another embodiment wherein the plumbing system is interconnected to a dual section of the flooring system.

DETAILED DESCRIPTION

The present invention will now be described in particular with reference to the accompanying drawings. Figures 1 and 2 show a module 12 of the first preferred
15 embodiment of a flooring system 10 for catching waste products. Figure 1 is a prospective view of the first embodiment of the flooring system 10 illustrating the connective relationships of horizontally adjacently disposed modules 12 that make up the flooring system 10 illustrating the module 12 and the relationship of a drain pan 14 and floor grids 24 that make up the module 12 of the first embodiment.

20 Although Figures 1 and 2 show the module 12 as having three of the floor grids 24 disposed upon the drain pan 14, it is contemplated that the module 12 may include at least one or any number of floor grids 24. Preferably, such floor grids 24 will collectively be sufficient to cover the drain pan 14. The drain pan 14 is shown in the figures as having a generally rectangular shape. However, the drain pan 14 may
25 be configured in any number of shapes and sizes. Preferably, the drain pan 14 is configured such that the modules 12 may be interconnected to one another in a horizontally aligned manner. Each one of the drain pans 14 may have a square shape with the floor grid 24 being sized and configured complementary to the shape of the drain pan 14.

30 Referring still to Figures 1 and 2, as can be seen, the drain pan 14 includes a drain channel 40, a pair of ramps 16, a pair of side walls 26 and a pair of end walls 42. The ramps 16 are disposed on opposite sides of the drain channel 40 along the length of the drain channel 40. As can be seen in Figure 2, the ramps 16 are oriented to

slope downwardly along a direction indicated by the arrows (i.e., towards the drain channel 40). The drain channel 40 is interposed between the side walls 26 and extends between the end walls 42.

5 The drain channel 40 itself may be configured to slope downwardly from one end of the drain pan 14 to the opposite end of the drain pan 14 toward a drain outlet 18. The drain outlet 18 may be connected to a drainage or sewage system of the facility within which the flooring system 10 is installed. A removable drain basket 78 may be provided with the flooring system 10 and may be installed over the drain outlet 18 for preventing solids or semisolid waste products of a predetermined size
10 from entering the drain outlet 18. Alternatively, or in conjunction with the drain basket 78, an elongate, flat filtering mesh 62 may be provided along the length of the drain channel 40, (shown only in Figure 2), to provide an additional measure of filtering of waste products.

As shown in Figure 2, the drain channel 40 may slope downwardly toward the
15 centralized drain outlet 18 positioned midway along the drain channel 40. In this regard, the drain channel 40 may have two separate sloping surfaces that slope toward one another toward the centrally located drain channel 40. However, the configuration of the drain pan 14 wherein the drain channel 40 has only the single sloping surface is preferred. In this configuration, the drain channel 40 slopes
20 downwardly from one of the end walls 42 of the drain pan 14 toward the other one of the end walls 42 of the drain pan 14.

The drain outlet 18 is preferably positioned adjacent to one of the end walls 42. The end walls 42 as well as the side walls 26 extend upwardly from the ramps 16 to enclose the drain pan 14. Likewise, the end walls 42 also extend upwardly from
25 the drain channel 40 to provide enclosure to the drain pan 14. Provided in each one of the ramps 16 may be a plurality of discharge ports 22 which are specifically configured for releasing or spraying flushing fluid onto the ramps 16 such that waste products are washed down the ramp 16 toward the drain channel 40.

As was earlier mentioned, floor grids 24 may be mounted atop each one of the
30 drain pans 14. In order to enhance removability and to facilitate washing and cleaning of the floor grids 24, the floor grids 24 may be provided in reduced sizes (i.e., widths) such that a plurality of floor grids 24 disposed in abutting relationship to one another are required for covering one of the drain pans 14. For example, as is

shown in Figure 2, three of the floor grids 24 are required in order to completely cover the drain pan 14.

The floor grids 24 are preferably appropriately sized and configured to support personnel, animals or other loads placed thereupon while permitting waste products to pass therethrough. The floor grids 24 are supported at the periphery of the drain pan 14 and may be specifically mounted on the side walls 26 such as along the grid support notches 82 extending along the length of each one of the side walls 26. In this regard, the floor grids 24 extend across the ramps 16 and the drain channel 40 and may be supported by the side walls 26. Optionally, grid support notches 82 may also be provided along each one of the end walls 42 such that the end most ones of the floor grids 24 may be supported by the grid support notches 82 along the end walls 42.

Although the figures show the drain pan 14 having side walls 26, it is contemplated that the module 12 may be comprised of a drain pan 14 having a single one of the ramps 16 that extends or wraps around the drain pan 14. In such an arrangement, the ramp 16 defines the drain pan periphery 20 from where it slopes downwardly toward the drain channel 40. Alternatively, the drain pan 14 may be configured such that the ramp 16 slopes downwardly towards the drain outlet 18. The drain pan periphery 20 may have a plurality of the discharge ports 22 spaced therealong for spraying flushing fluid onto the ramp 16.

In one embodiment, each one of the side walls 26 may include a hollow passage 28 formed therealong and through which flushing fluid may flow. A fluid inlet 30 may be provided in at least one of the end walls 42 as well as in the side walls 26 and is configured to provide flushing fluid to the ramps 16 via the hollow passages 28. Alternatively, in embodiments that omit the hollow passage 28, the flushing fluid may enter the fluid inlet 30 and may be provided directly to the ramps 16. However, the fluid inlet 30 may provide a conduit through which a manifold 94 may pass and which carries flushing fluid to the discharge ports 22 or spray nozzles 32.

As can be seen in Figure 1, the self-cleaning flooring system 10 of the present invention may be comprised of a plurality of the modules 12 with each one of the modules 12 being configured to be connectable to one another in horizontal alignment. Interconnectability of the modules 12 is facilitated through the use of mechanical fixtures such as, for example, a dowel 36 and aperture 38 system wherein

dowels 36 are provided in one of the modules 12 and into which may be received by apertures 38 formed in an adjacent one of the modules 12.

However, it will be appreciated that the module 12 may be interconnected to one another through a variety of attachment mechanisms and is not limited by the specific embodiments or configurations shown and disclosed herewithin. As shown in Figure 2, the module 12 may include at least one strainer tray 74 which may be configured to extend along the length of the drain channel 40 and which may be mounted above the drain channel 40. The strainer tray 74 is preferably configured to fit within the drain channel 40 and is operative to prevent waste products of a predetermined size from entering the drain channel 40.

As can be seen in Figure 2, the strainer tray 74 extends along the length of the drain channel 40 and is specifically adapted to complement the dual sloped surface of the drain channel 40. In this regard, the strainer tray 74 has a middle thickness which is larger than the thickness at the free ends of the strainer tray 74. The strainer tray 74 may additionally include a grate 76 that acts as a filtering mechanism to prevent waste products from passing into the drain channel 40. For configurations wherein the drain channel 40 is configured as a single sloping surface sloping downwardly toward the drain outlet 18 at an end of the drain pan 14, the strainer channel is preferably configured complimentary thereto. More specifically, the strainer tray 74 is preferably configured to be thicker at one end than at an opposite end such that the grate 76 mounted atop the strainer tray 74 is disposed in general horizontal orientation when installed in the drain channel 40.

Turning now to Figures 9-12, shown is a self-cleaning flooring system 10 of the present invention in an embodiment that may be installed on a substrate 88 such as a concrete substrate 88. As can be seen in Figure 10, the drain pan 14 may be installed on a setting bed of dry packed concrete although the drain pan 14 may be installed on a substrate 88 of any composition. The periphery of the drain pan 14 may include a perimeter flange 80 extending therearound which acts as a ledge upon which the drain pan 14 may be supported. The perimeter flange 80 extends laterally outwardly from side walls 26 of the drain pan 14. Preferably, the perimeter flange 80 is installed so as to be even with floor level 86. More specifically, the perimeter flange 80 of the drain pan 14 is preferably installed to be flush with an upper surface

of the floor covering 84 at the floor level 86 such as floor tile or other floor coverings 84.

As can be seen in Figure 10, the ramps 16 of the drain pan 14 may be installed on the substrate 88 such as the concrete substrate 88 which may, in turn, be installed over a base surface such as a grading 90 of earthen or soil. The setting bed then may be in turn laid atop the concrete substrate 88 and may be comprised of dry packed concrete. The floor covering 84 such as floor tile may be then, in turn, installed over the setting bed. The perimeter flange 80 may be installed over the setting bed and is preferably level with the floor level 86.

The embodiment of the flooring system 10 shown in Figures 9-12 is similar in configuration to that which is shown in Figures 1-2 and which is described above. More specifically, the drain pan 14 as shown in Figures 9-12 may be comprised of a pair of opposing ramps 16 that slope downwardly toward a drain channel 40. However, it is contemplated that each one of the modules 12 may be comprised of a drain pan 14 having only one ramp 16 with a drain outlet 18 disposed in a corner of the drain pan 14. The ramp 16 may slope downwardly toward the drain outlet 18. However, it is believed that the configuration shown in Figures 1 and 2 and Figures 9-12 is preferable wherein the drain pan 14 is comprised of a pair of ramps 16 disposed on opposite sides of the drain channel 40. The drain channel 40, as described above, is sloped downwardly toward the drain outlet 18 which is located adjacent to the end wall 42.

Referring still to Figure 10, as can be seen, the opening formed in the substrate 88 and setting bed is sized to be slightly larger than the drain pan 14. More specifically, the opening includes areas into which plumbing (such as a manifold 94 for carrying flushing fluid), may be installed after curing of the concrete. Once the plumbing is installed, the drain pan 14 can be installed with portions of the ramp 16 resting upon the substrate 88.

The drain pan 14 may then be supported at the periphery thereof by installation of the dry packed concrete which forms the final setting bed. In this regard, the dry packed concrete fills voids underneath the side wall 26 and perimeter flange 80. The drain pan 14 may be checked for levelness to ensure proper functioning and flowing of the flushing fluid during operation of the flooring system

10. It is contemplated that reinforcement bar may be provided to assist in leveling of the drain pan 14 prior to installation of the setting bed.

It is contemplated that the drain pan 14 may be installed in multi-floor buildings wherein steel decking may be utilized as the substrate 88. In this regard, the drain pan 14 can be accommodated with appropriate cutouts to allow fitment and support of the drain pan 14 on the steel decking. The flooring system 10 of the present invention may be installed similar to the method for installing a floor sink or trough. Mounting straps may be secured to the decking prior to pouring of concrete which, in turn, occurs prior to installation of the drain pan 14. As was earlier mentioned, it is preferable that the drain pan 14 is checked for levelness prior to pouring or curing of the concrete.

Following installation of the manifold 94 and installation of the drain pan 14, the appropriate number of discharge ports 22 such as spray nozzles 32 may be fluidly connected to the manifold 94 such that flushing fluid passing through the manifold 94 may be discharged out of the spray nozzles 32. As can be seen in Figure 11, three of the spray nozzles 32 are provided on opposite sides of the drain pan 14 and are extended through the ramp 16 portions thereof. The spray nozzles 32 may be threadably connected to the manifold 94. Although three of the spray nozzles 32 are shown on each side of the drain pan 14, any number may be provided.

Furthermore, although the spray nozzles 32 are shown in Figure 10 as extending through a crease or slope-change in the ramp 16, it is contemplated that the spray nozzles 32 may be installed anywhere along the ramps 16. Furthermore, although the ramp 16 shown in Figure 10 has a doubly-sloped surface, it is contemplated that the ramp 16 may be provided with a singly sloped surface extending from the side wall 26 down to the drain channel 40. Additionally, it is contemplated that the ramp 16 may be curved or have a multiply angled or sloped surface. However, it is believed that the single or doubly sloped surface is preferred in order to enhance the washing of the waste products down the ramp 16 toward the drain channel 40.

Referring to Figure 3, shown is a longitudinal sectional view of the module 12 taken along line 3-3 of Figure 1 and illustrating ramps 16 sloping downwardly toward the drain channel 40. As can be seen in Figure 3, the fluid inlets 30 allow for the flushing fluid to flow between adjacent ones of the modules 12 with the endmost

module 12 in the flooring system 10 being connected to the flushing fluid source. The fluid inlet 30 may be connected to a fluid supply wherein the fluid is delivered to the hollow passages 28 or to the drain pan 14 via a manifold 94 or other similar plumbing system 96.

5 The flushing fluid may contain additives such as degreasers which may be injected into the fluid. The fluid may be water based or may be comprised of alternative liquids. For example, degreaser may be provided or injected into the fluid in order to break down grease that is deposited on the ramp 16. As can be seen in Figure 3, the fluid inlets 30 may be disposed on the side walls 26 and/or the end walls 10 42 and may be concentric with the hollow passage 28 to allow fluid to flow therebetween. If the hollow passages 28 are not included, the fluid inlets 30 may be connected to a manifold 94 or other plumbing connection wherein the discharge ports 22 and/or spray nozzles 32 receive flushing fluid therefrom.

Turning now to Figure 4, shown is an enlarged partial sectional view of the 15 module 12 taken from Figure 3 and illustrating the connective relationship of the spray nozzle 32 within the side wall 26. As was earlier mentioned, the spray nozzle 32 or discharge port 22 may be disposed above or adjacent to the ramps 16. The discharge ports 22 may be internally threaded for receiving the spray nozzles 32 which may be included in the module 12. The spray nozzles 32 may be discharged 20 from the flushing fluid at an elevated pressure level in order to improve the effectiveness with which the waste products may be washed down the ramps 16 toward the drain channel 40. The spray nozzles 32 may be conventional spray nozzles 32 or alternatively, may be water jets that are integrated into the manifold 94 without separate spray nozzles 32.

25 Regarding operation of the discharge ports 22 and/or spray nozzles 32, it is contemplated that flushing fluid may be discharged therefrom via manual or automatic activation. For automatic activation, a timer 70 may be included with the flooring system 10 in order to periodically or at scheduled intervals, release flushing fluid into the ramps 16. Furthermore, the spray nozzles 32 and/or discharge ports 22 30 may be activated via a thermal sensor such that flushing fluid may be discharged in case of fire in the facility in which the flooring system 10 is installed. Referring still to Figure 3, the drain pan 14 may include at least one overflow passage 48 proximate the drain channel 40 to allow for the flow of flushing fluid and/or liquid waste

products between adjacent ones of the modules 12. The overflow passages 48 may be formed in the end walls 42 of the drain pan 14 and may be collocated such that when the modules 12 are connected together, the passage is provided via the overflow passages 48.

5 As is shown in Figure 4, the drain pan 14 supports the floor grid 24 via a grid support notch 82 that is formed in the side wall 26. As is shown in Figure 4, the grid support notch 82 is created via the formation of the hollow passage 28 which extends along the length of the side wall 26. Alternatively, as is shown in the preferred embodiment in Figures 9-12, the grid support notch 82 is formed in the side wall 26 with the edge of the floor grid 24 resting along the grid support notch 82. A lower peripheral edge of each one of the floor grids 24 is preferably chamfered or radius to provide a gap between the side wall 26 and the floor grid 24 (i.e., the grid support notch 82) such that the floor grid 24 does not sharply bear against radius corners of the grid support notch 82. Furthermore, the lower peripheral edge may be chamfered or radius to provide a gap such that waste products may pass therebetween.

10 Referring to Figures 3-5, each one of the drain pans 14 may comprise or include parallel spaced rib members 46 disposed along a length of the drain pan 14 between the end walls 42. The parallel rib members 46 may be disposed widthwise under the ramps 16 and drain channel 40 for supporting the module 12 in an even fashion on the sub-floor such as a tile and grout sub-floor that is commonly found in commercial kitchens and other vending establishments. Likewise, as was earlier mentioned, the flooring system 10 may be installed in a variety of applications and industries including, but not limited to, dairies, meat processing plants, poultry operations, and stables wherein the rib members 46 may be utilized to support the drain pan 14 and drain channel 40 in an even manner.

25 The drain pan 14 may be formed of any suitable material including metallic and non-metallic materials. For metallic materials, it is contemplated that the drain pan 14 would be formed of stainless steel or otherwise suitable metallic material that is resistant to corrosion and or degradation due to the environmental effects. For non-metallic materials, it is contemplated that a polymeric material such as polyvinyl chloride (PVC) and/or polypropylene may be utilized.

30 Furthermore, fiberglass may be utilized. In this regard, it is contemplated that the drain pan 14 may be formed of any material that is suitable and that is compatible

with the elevated temperatures that the drain pan 14 may encounter during washing such as during washing in a commercial dishwasher. The drain pan 14 may be formed as a unitary structure by any method such as by injection molding. More specifically, it is contemplated that the side walls 26, end walls 42, drain channel 40, ramps 16 and rib members 46 as well as grid support notches 82 and other features of the drain pan 14 may be formed via an injection molding process so that the drain pan 14 is formed as a single unitary structure.

During fabrication, it is contemplated that all corners may be radiused in order to reduce the probabilities of stress cracking that may be induced by localized stresses in corners. Furthermore, radiused corners facilitate cleaning of the drain pan 14 wherein waste products that may otherwise gather in nooks and crannies and otherwise hard-to-reach-corners, are more easily washed and cleaned. The lower floor grids 24 may be radiused to be complementary to any radii formed in the grid support notches 82 above the side walls 26a. In this manner, the floor grid 24 lower surface and substantially abutting contact with the side wall 26 and/or grid support notch 82.

Turning now to Figure 5, shown in a transverse sectional view of the module 12 of the first embodiment taken along line 5-5 of Figure 1 and illustrating the drain channel 40 sloping downwardly toward the drain outlet 18. In Figure 5, the rib members 46 can be seen extending vertically downwardly from the ramp 16 lower surface. Discharge ports 22 can be seen disposed within the side wall 26 and extending along the length thereof. The discharge ports 22 may be evenly spaced between the end walls 42 although any spacing is contemplated for the discharge ports 22.

The strainer tray 74 is shown disposed above or mounted within the drain channel 40 which extends from end wall 42 to end wall 42. As was earlier mentioned, the strainer tray 74 includes a grate 76 which prevents the entry of solid or semisolid waste products into the drain channel 40 which may otherwise fall into the drain outlet 18 resulting in clogging thereof. As a final measure of protection, a removable drain basket 78 may be included in the drain outlet 18 and disposed thereover in order to prevent solid waste from falling into the drain outlet 18 and clogging down stream features such as a grease trap.

In Figures 1-5 as well as in Figures 10 and 13, the floor grids 24 are shown formed as an array of spaced parallel grid members 34 that are joined together with the transversely disposed spaced grid members 34. The spacings of the grid members 34 is preferably such that passage of semisolid and liquid waste products is allowed while preventing passage of waste products of a predetermined size. As was earlier mentioned, the floor grids 24 are sized and configured to span between the side walls 26 of the drain pan 14. Similar to the materials used for forming the drain pan 14, the floor grids 24 may be formed of high strength material.

For example, the floor grids 24 may be fabricated of fiberglass material as such material is lightweight to allow easy removal for cleaning of the flooring system 10 as well as for cleaning of the floor grid 24 itself, as well as highly structurally sound in order to support the personnel working and standing thereupon. It will be understood that the floor grids 24 may be formed of any material and in any configuration sufficient to prevent passage of waste products of a predetermined size. Furthermore, it is contemplated that the material used in fabricating the floor grids 24 is compatible with commercial cleaning equipment such as commercial dishwashers and therefore is capable of surviving elevated temperatures. The embodiment of the floor system 10 may be of any size and shape. However, it is contemplated that in order to facilitate cleaning of the modules 12, it is contemplated that the width of the drain pan 14 and floor grid 24 is compatible with cleaning equipment.

Turning now to Figures 6 and 7, shown is a second embodiment of a self-cleaning flooring system 10 which, as was earlier mentioned, comprises at least one module 12, but preferably comprises a series of modules 12 joined end-to-end. Each one of the modules 12 comprises a drain pan section 66 which is itself comprised of a pair of first and second ramp sections 50, 52, and a channel section 54 which is disposed between the first and second ramp sections 50, 52. As shown in Figure 6 and 7, the first ramp section 50 is joined to the second ramp section 52 which is interconnected to the channel section 54. The channel section 54 is preferably configured to removably interconnect the first and second ramp sections 50, 52 together at a lower side portion 58 of each one of the first and second ramp sections 50, 52.

As was mentioned for the configuration in Figures 1-5, the first and second ramp sections 50, 52 slope downwardly toward the channel section 54. The module

12 shown in Figures 6 and 7 is also comprised of at least one discharge port 22 which is preferably mounted above or adjacent to the first and/or second ramp sections 50, 52 and which is operative to separate flushing fluid onto the first and second ramp section 50, 52 such that waste products are washed down the first and second ramp sections 50, 52 toward the channel section 54 and then from the channel section 54 toward the drain outlet 18.

The configuration of the flooring system 10 shown in Figures 6 and 7 is similar to that which is shown and described above in Figures 1-5 except for the drain pan section 66 being comprised of the first and second ramp sections 50, 52 and channel section 54. Furthermore, the drain pan section 66 shown in Figures 6 and 7 may further comprise end plates 64 which may be disposed on extreme ends of each one of the modules 12 after assembly of consecutive ones of the drain pan sections 66.

For example, as is shown in Figure 7, the end plate 64 may be secured to an extreme end of one pair of drain pan sections 66 which are adjoined end-to-end. Another one of the end plates 64 may be adjoined to an opposite end of the module 12 which comprises two of the drain pan sections 66. Each one of the drain pan sections 66 includes the channel section 54 which includes the drain outlet 18 at an end thereof. Preferably, the channel section 54 slopes downwardly toward the drain outlet 18 but is not necessarily so. For example, it is contemplated that the channel section 54 may be formed with no slope and may be horizontally formed.

Each one of the first and second ramp sections 50, 52 may include at least one rib member 46 which extends from the side wall 26 of the ramp 16 section toward the drain channel 40. The rib member 46 is disposed under the ramp 16 section and is preferably configured to support the ramp 16 section above a substrate 88. As can be seen in Figure 7, the first ramp section 50 is of a narrower width than the second ramp section 52 although the first and second ramp sections 50, 52 may be equally configured.

A plurality of discharge ports 22 and/or spray nozzles 32 may be disposed along upper side portions 56 of the first and second ramp sections 50, 52. At least one strainer tray 74 may be mounted above the channel section 54 and may be configured to prevent waste products of a predetermined size from entering the drain channel 40. Alternatively, a plurality of strainer trays 74 may be connected end-to-end and mounted above each one of the drain channels 40. Optionally, the strainer tray 74

may be omitted such that waste products of any size may be flushed down the drain outlet 18 and may pass into a holding tank.

Although the drain pan assembly 68 and, more specifically, drain pan sections 66 of the second embodiment may be of any size and any shape, it is contemplated that the first ramp section 50 is sized to be compatible with commercially available cleaning equipment as well as the second ramp section 52 being likewise sized to facilitate cleaning. Accordingly, the floor grids 24 are preferably sized to be compatible with commercial cleaning equipment. In this regard, depending upon the method of cleaning, it is contemplated that the drain pan sections 66 and, hence, the drain pan assemblies 68, may be formed at any size and any shape.

As can be seen in Figure 7, vertically extending grid supports 60 may be provided with the first and second ramp sections 50, 52 in order to support the floor grids 24. For industries where a person may be standing on the floor grids 24 for an extended period of time, it is contemplated that such grid supports 60 may be either limited or all together removed in order to allow some degree of flexing in the floor grid 24 in order to enhance the comfort of personnel standing thereupon for extended periods of time. As can be seen, one of the drain pan sections 66 omits the use of the grid supports 60 while the other one of drain pan sections 66 which is joined end-to-end includes the floor grid support 60 for exemplary purposes only.

Referring now to Figure 13, shown is the flooring system 10 in a further embodiment wherein the drain pan 14 is formed or cast into a substrate 88 such as a concrete substrate 88. More specifically, the flooring system 10 shown in Figure 13 illustrates the drain pan 14 having the same or similar features as described above for the flooring systems 10 of Figures 1-5 and 9-12. More specifically, the substrate 88 itself forms the shape of the drain pan 14 wherein the substrate 88 itself includes a pair of ramps 16 which slope downwardly toward a drain channel 40 with the drain channel 40 itself sloping downwardly toward the drain outlet 18. The drain pan 14 defines the periphery thereof with a perimeter flange 80 being formed around the drain pan 14 for supporting the floor grid 24 on an upper surface of the substrate 88.

As shown in Figure 13, the flooring system 10 further includes a manifold 94 which may be extended along a portion of the drain pan 14 and which is formed within a corner of one of the ramps 16. The manifold 94 extends along a portion of the ramp 16 and is disposed above the ramp 16 in order to provide flushing fluid to

the ramp 16 for washing waste products down to the drain channel 40. The flooring system 10 further includes a spray nozzle 32 which may be fluidly connected to the manifold 94 and may be operative to spray flushing fluid down the ramp 16 toward the drain channel 40. However, it should be noted that the spray nozzle 32 may be omitted with apertures 38 instead being formed in the manifold 94 to form ports through which flushing fluid may be discharged for spraying flushing fluid down the ramps 16.

The cast concrete system which forms the flooring system 10 of the present invention may be developed for use in any of the above-mentioned applications and industries. For example, the cast concrete system may be used in dairies, meat processing plants, stables and other facilities and applications that typically endure heavy wear due to contact with the heavy animals. Other applications where the cast concrete system for the flooring system 10 shown in Figure 13 include poultry operations, emergency rooms, machine shops, clean rooms, printing facilities, food processing plants and other industrial operations. Furthermore, the flooring system 10 of the present invention may be used in transition areas in animal processing applications.

For example, the flooring system 10 of the present invention may be used between a feed yard and dairy milking stations. In this regard, the flooring system 10 may be installed in certain transition areas and may include an above-ground spray element that could be triggered by hooves of livestock passing over the flooring system 10. Once the spray element is triggered, fluid may be sprayed onto the livestock hooves while such livestock is entering the dairy milking station such that undesirable residue (e.g., manure) may be washed from the livestock hooves and into the flooring system 10 for later retrieval as fertilizer. It is contemplated that a triggering mechanism may be included with the flooring system 10 to activate the spray element. Such triggering mechanism may be configured as an infrared beam that is triggered by the livestock hooves.

Regarding the first above-mentioned application for the cast concrete system of the flooring system 10, it is contemplated that the manifold 94 and/or spray nozzles 32 and/or discharge ports 22 that are typically used for washing flushing fluid down the ramps 16, may also be used for spraying animals hooves as they cross over the flooring system 10. In this manner, unwanted sediments and manure from stockyards

may be washed from the hooves of livestock to increase the hygiene and cleanliness of the facility into which the flooring system 10 is installed.

As was earlier mentioned, in a dairy, it is contemplated that the flooring system 10 may be configured to spray the hooves of dairy cows when brought into a milking facility such as into a rotating milking system. Advantageously, the flooring system 10 as shown in Figure 13 is installed as a cast-in-place system wherein the drain pan 14 itself is formed directly in the substrate 88 such as the concrete substrate 88. Ideally, the drain pan 14 is located in the area in which it is to be installed via location of the drain channel 40 flowing down towards the drain outlet 18. Furthermore, it is contemplated that the floor grids 24 for such an application are appropriately sized and configured to handle heavy loads imposed by large livestock such as cattle. In this regard, it is contemplated that the floor grids 24 have an increased thickness such as a two (2) inch thickness for increased load-bearing capacity. As shown in Fig. 13, floor grid supports 60 may be included to provide additional support against heavy loads.

As shown in Figure 13, the drain pan 14 may be formed in the substrate 88 using a removable insert which is configured as a male mold that duplicates the shape of the drain pan 14. Figure 13 represents one-half of the installation with the other half being symmetrically formed about the vertical centerline. However, it is contemplated that the installation of the drain pan may be asymmetrical. As was earlier mentioned, the male mold will ideally include the features described above for the drain pan 14 such as the side wall 26, grid support notch 82, ramps 16, and drain channel 40.

The removable insert may preferably be formed as a foam material which may be shaped as a single unitary piece of foam or may be shaped as a series of foam inserts 92 which are individual pieces that collectively define the drain pan 14 shape when installed prior to flooring of the substrate 88 such as a concrete substrate 88. Installation of the flooring system 10 is accomplished by initially laying out and locating the drain pan 14 with reference to the drain outlet 18 such as the drain channel 40 the drain pan 14 is roughly centered on the drain outlet 18.

The foam may be placed in the shape of the drain pan 14 after which the concrete may be poured underneath around the insert. Just prior to or after curing of the concrete, the foam insert 92 may be removed after which the concrete can proceed

to final cure. As can be seen in Figure 13, a depression may be formed in the ramp 16 to receive the manifold 94 which may run lengthwise along the ramp 16. The manifold 94 may be connected to the flushing fluid source and is operative to spray flushing fluid down the ramp 16. The grid support notch 82 is formed in the side wall 26 and is specifically shaped and configured to be complementary to the thickness of the floor grid 24 for support of the floor grid 24 thereupon.

Referring now to Figures 14 and 15, shown therein is a schematic diagram illustrating a plumbing system 96 as may be connected to the flooring system 10 of the present invention. Figure 14 illustrates the plumbing system 96 interconnected to a series of discharge ports 22 and/or spray nozzles 32 installed in a single section of the flooring system 10. As can be seen in Figure 14, the flooring system 10 includes two modules 12 connected end-to-end with each module 12 including six discharge ports 22 and/or spray nozzles 32. The spray nozzles 32 on one side of the flooring system 10 are connected in series. This schematic diagram of Figure 14 illustrates the proper assembly for flooring system 10 configurations having anywhere from four to sixteen spray nozzles 32.

Figure 15 is a schematic diagram of the plumbing system 96 in a further embodiment wherein a pair of flooring systems 10 is interconnected to the plumbing system 96 in parallel. More specifically, the plumbing system 96 supplies flushing fluid to a first flooring system 10 and a second flooring system 10 illustrated in Figure 15 as being disposed above one another. As will be appreciated, the flooring system 10 shown in Figure 14 is similar to one of the pairs of flooring systems 10 illustrated in Figure 15. It is contemplated that the flushing fluid is provided by a water supply line 100. Such water supply may be a cold water supply line 100 having a diameter of about $\frac{1}{2}$ inch in a standard supply line 100. However, it is contemplated that a $\frac{3}{4}$ inch diameter water supply line 100 may be provided with the plumbing system 96.

Minimum static pressure for the water supply line 100 is preferably about fifty-five PSI although the water supply may be provided in any pressure level. However, it is preferable that consistent water pressure be provided to the flooring system 10 and, therefore, depending upon the number of spray nozzles 32 and/or discharge ports 22 included within the flooring system 10, a complementary supply line 100 diameter and pressure level should be provided. Along these lines, it is contemplated that a pressure source may be included in the plumbing system 96 such

as a pressure tank 72 in order to add the appropriate amount of pressure to the flooring system 10 and plumbing system 96. Even further, the plumbing system 96 may include a pump in order to increase the pressure level of the flushing fluid supply.

Referring to Figure 14, it can be seen that the flushing fluid may be provided via a supply line 100 which feeds into a shutoff valve 102 that may be activated under certain circumstances such as upon loss of power. Also included in the schematic diagram is a check valve 104 which may be interposed between the pressure tank 72 and the shutoff valve 102 to prevent back flow of flushing fluid. Downstream of the pressure tank 72, a solenoid-controlled-valve 106 may be included.

The valve may be controlled by a timer 70 or by a manual switch. The supply line 100 leading to the flooring system 10 may preferably be a $\frac{3}{4}$ inch diameter supply line 100 in order to provide adequate flow of flushing fluid to the flooring system 10. Each one of the flooring systems 10 may include a header 98 disposed on one end thereof for connection to the plumbing system 96. As can be seen in Figure 14, each of the spray nozzles 32 on one of the sides of the flooring system 10 is preferably connect in series. A cap may be provided at the end of each one of the series of discharge ports 22 and/or spray nozzles 32.

Referring now to Figure 15, shown is the schematic diagram having a pair of the flooring systems 10 installed in parallel. The plumbing system 96 provides flushing fluid, such as water, to the respective ones of the flooring systems 10. The componentry of the schematic diagram shown in Figure 15 is similar to that described and shown in Figure 14 above. However, a pair of the solenoid-controlled-valves 106 are included at a split in the supply line 100. Notably, instead of connecting the discharge ports 22 and/or spray nozzles 32 in series, the schematic diagram of Figure 15 show an alternative arrangement wherein three of the spray nozzles 32 are connected to another three of the spray nozzles 32 in parallel with one another. A cap may be provided at an end of each one of the series of three spray nozzles 32.

Regarding drainage from the drain outlet 18, it is contemplated that a three inch diameter connection be utilized in order to connect a waste conduit of at least three inches in diameter to each one of the flooring systems 10. As was earlier mentioned, the drain outlet 18 may lead to a grease trap. Timers 70 and solenoids may optionally be further included in the flooring systems 10 and may be either manually or autonomously operated. It is contemplated that the timer 70 system may

include a manual override in order to allow an operator additional control in the frequency of spraying of the flushing fluid.

Regarding the pressure tank 72, it is contemplated that each pressure tank 72 may include the capability for containing about six gallons of flushing fluid in order to produce about three to four gallons of flushing fluid that may be pressurized to about thirty to thirty-five PSI. An additional valve may be included with the pressure tank 72 in order to provide control over the operating pressure at which the pressure tank 72 operates. As was earlier mentioned, commercial degreasing agents and other additives may be injected into the plumbing system 96 supply line 100 as shown in Figures 14 and 15 as required.

The operation of the flooring system 10 will now be described with reference to Figures 1-15. The flooring system 10 as shown in Figures 1-2 may be installed initial by placing the drain pan 14 on the surface to which it is to be mounted. As was earlier mentioned, such surface may include a concrete flooring substrate 88 or a steel decking arrangement although various other configurations are contemplated upon which the flooring systems 10 may be installed. The following connection of the plumbing system 96 as illustrated in Figures 14-15, the flushing fluid may be provided to the pressure tank 72 and then to the series of discharge ports 22 and/or spray nozzles 32 upon activation of the plumbing system 96.

Such activation may be autonomous via a timer 70 or via manual activation by the appropriate personnel. During use, waste products fall through the floor grids 24 and pass therethrough landing on the ramps 16. At appropriate intervals or when manually activated, flushing fluid is discharged onto the ramps 16 washing the waste products down to the strainer tray 74 if included. The grating of the strainer tray 74 prevents waste products of a predetermined size from entering into the drain channel 40. The flushing fluid causes the waste products to fold toward the drain outlet 18 wherein the addition of a drain basket 78 further prevents entering of such waste products into the drain outlet 18 and clogging of the grease trap.

For the drain pan assembly 68 modules 12 as shown in Figures 3-7, following interconnection of the channel section 54 to the first and second ramp sections 50, 52 and securing of the end plates 64 upon abutting connection of the drain pan sections 66, the plumbing may then be interconnected thereto. Operation and maintenance of the flooring system 10 is similar to that which we described below with reference to

Figures 1-2. For the flooring system 10 illustrated in Figure 13, installation of the drain pan 14 is effectuated through the use of a foam insert 92 which is set in place after which concrete substrate 88 is then poured therearound. Removal of the foam insert 92 and carrying of the concrete substrate 88 results in the creation of the drain pan 14 having features similar to that described above for Figures 1-7. Following placement of the floor grids 24 on the side walls 26, waste products may then fall through the floor grids 24 and are flushed down into the drain outlet 18 in a manner similar to that described above.

Maintenance of the flooring system 10 may be effectuated wherein the floor grids 24 may be removed and may be manually hosed off or washed using the cleaning equipment available in the facility. For example, in a commercial kitchen, it is contemplated that the floor grids 24 are washed at each days end in a commercial dishwasher such that such floor grids 24 are ready for reinstallation. A commercial degreaser may be included with the flushing fluid and which may be hand sprayed on the grates 76 prior to washing in order to remove grease build up. Other chemicals and additives may be injected in the supply line 100 to prevent grease build up on the ramp 16 and drain channel 40 areas. In this same manner, the strainer tray 74 as well as the drain basket 78 may be cleaned and checked.

It is contemplated that floor grids 24 of different colors be utilized in order to easily monitor washing cycles and replacement. For example, one color of the floor grid 24 may be used for even numbered bays while another color of a floor grid 24 may be utilized for odd numbered bays. During removal of the floor grids 24, the discharge ports 22 and/or spray nozzles 32 may be adjusted such that the alignment thereof is checked to ensure that such spray nozzles 32 are spraying evenly down the ramps 16. Furthermore, various components of the plumbing system 96 should be checked such as the pressure tank 72, shutoff valves 102, solenoid-control-valves 106 and supply lines 100.

The above description is given by way of example, and not limitation. Given the above disclosure, one skilled in the art could devise variations that are within the scope of the invention disclosed herein. Further, the various features of the embodiments disclosed herein can be used alone, or in varying combinations with each other and are not intended to be limited to the specific combination described

herein. Thus, the scope of the claims is not to be limited by the illustrated embodiments.

WHAT IS CLAIMED IS:

1. A self-cleaning flooring system including at least one module, the module comprising:

a drain pan having at least one ramp and a drain outlet, the ramp sloping downwardly toward the drain outlet; and

at least one side wall and one end wall forming at least a portion of a periphery of the drain pan, the end wall having at least one fluid inlet, the side wall having at least one discharge port configured to receive flushing fluid from the fluid inlet and direct flushing fluid down the ramp toward the drain outlet.

2. The self-cleaning flooring system of Claim 1 comprising a plurality of the modules, each one of the modules being configured to be connectable to one another in horizontal alignment.

3. The self-cleaning flooring system of Claim 1 wherein the side wall includes a hollow passage extending therethrough, the hollow passage being in fluid communication with the fluid inlet and being configured to deliver flushing fluid to the discharge port.

4. The self-cleaning flooring system of Claim 1 further including a removable drain basket positioned adjacent to the drain outlet and being operative to prevent solid waste from entering the drain outlet.

5. The self-cleaning flooring system of Claim 1 wherein the module further includes at least one floor grid mounted on the drain pan and being configured to support personnel standing thereupon and permitting waste products to pass therethrough.

6. The self-cleaning flooring system of Claim 1 wherein the module further includes at least one strainer tray mounted above the drain channel and being configured to prevent waste products of a predetermined size from entering the drain channel.

7. The self-cleaning flooring system of Claim 1 wherein the drain pan includes a perimeter flange extending around the drain pan periphery and being configured for supporting the drain pan.

8. The self-cleaning flooring system of Claim 1 further including at least one pressure tank in fluid communication with the fluid inlet and being configured to deliver pressurized flushing fluid thereto.

9. A self-cleaning flooring system including at least one module, the module comprising:

a drain pan section, comprising:

a pair of ramp sections; and

a channel section disposed between the ramp sections, the channel section being configured to removably interconnect the ramp sections, the channel section sloping downwardly toward a drain outlet;

wherein each one of the ramp sections is oriented to slope downwardly toward the channel section; and

at least one discharge port mounted adjacent to the ramp sections and being operative to spray flushing fluid onto the ramp sections such that waste products are washed down the ramp sections toward the channel section and from the channel section toward the drain outlet.

10. The self-cleaning flooring system of Claim 9 wherein the drain outlet is located adjacent one end of the channel section, the channel section sloping downwardly toward the drain outlet.

11. The self-cleaning flooring system of Claim 9 further comprising:

at least one end plate;

wherein each module comprises a plurality of drain pan sections connected end-to-end and having an end plate mounted on at least one end thereof.

12. The self-cleaning flooring system of Claim 11 wherein the ramp sections and the channel section are formed as separate components.

13. The self-cleaning flooring system of Claim 9 comprising a plurality of the modules, each one of the modules being configured to be connectable to one another end-to-end.

14. The self-cleaning flooring system of Claim 9 wherein each one of the ramp sections includes at least one rib member disposed thereunder and being configured to support the ramp section above a substrate.

15. The self-cleaning flooring system of Claim 9 wherein the module further includes at least one floor grid mounted on the drain pan section and being configured to support personnel standing thereupon and permitting waste products to pass therethrough.

5 16. The self-cleaning flooring system of Claim 9 wherein the module further includes at least one strainer tray mounted above the channel section and being configured to prevent waste products of a predetermined size from entering the drain channel.

10 17. A self-cleaning flooring system formed in a substrate, comprising:
a drain pan having a pair of ramps sloping downwardly toward a drain channel, the drain channel sloping downwardly toward a drain outlet, the drain pan defining a periphery with a perimeter flange extending therearound;
a manifold extending along a portion of the drain pan and being disposed above at least one of the ramps; and
15 a spray nozzle fluidly connected to the manifold and being operative to spray flushing fluid down the ramp toward the drain channel and toward the drain outlet.

18. The module of Claim 17 wherein the substrate is concrete.

20 19. The module of Claim 17 wherein the drain pan is formed in the substrate using a removable insert configured as a male mold.

20. The module of Claim 17 wherein the insert is a foam material.