

TECHNIQUES FOR CONSTRUCTING THEMED ROCKWORK STRUCTURES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 63/533,531, entitled “TECHNIQUES FOR CONSTRUCTING THEMED ROCKWORK STRUCTURES,” filed August 18, 2023, which is hereby incorporated by reference in its entirety for all purposes.

BACKGROUND

[0002] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present disclosure. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be noted that these statements are to be read in this light and not as admissions of prior art.

[0003] The subject matter disclosed herein relates to the construction of rockwork features, and more specifically, to an improved rockwork system for themed amusement park environments.

[0004] Amusement parks or theme parks may include various entertainment attractions useful in providing enjoyment to guests of the amusement parks. For example, the attractions may include a ride attraction (e.g., closed-loop track, dark ride, thrill ride, or other similar ride), and the attraction may be part of a themed environment that may be traditionally established using equipment, furniture, building layouts, props, decorations, displayed media, and so forth. Structures in these environments may be constructed using conventional building techniques, and components of the structures may be custom-built for the themed environment. However, forming these custom-built components is complex and time-consuming.

BRIEF DESCRIPTION

[0005] Certain embodiments commensurate in scope with the originally claimed subject matter are summarized below. These embodiments are not intended to limit the scope of the disclosure, but rather these embodiments are intended only to provide a brief summary of certain disclosed embodiments. Indeed, the present disclosure may encompass a variety of forms that may be similar to or different from the embodiments set forth below.

[0006] The present embodiments relate to techniques for constructing themed rockwork for a themed environment of an amusement park.

[0007] In accordance with an embodiment, a rockwork system comprises a support structure, and the support structure comprises a plurality of modular construction blocks. The plurality of modular construction blocks comprises at least one terminal modular construction block forming an exterior face of the support structure, and the at least one terminal modular construction block comprises a first coupler in a first coupler active configuration. The support structure also comprises at least one additional modular construction block coupled to the at least one terminal modular construction block, and the at least one additional modular construction block comprises a second coupler in a second coupler inactive configuration. The rockwork system also comprises at least one exterior shaped piece comprising a mesh support, and the at least one exterior shaped piece is disposed at least partially around the support structure and is coupled to the first coupler of the at least one terminal modular construction block via a complementary coupler.

[0008] In an embodiment, a rockwork structure comprises at least one modular construction block comprising at least one coupler, and an exterior shaped piece comprising a mesh support disposed around the at least one modular construction block. The exterior shaped piece comprises a mesh support, a filler material disposed within the mesh support, and at least one complementary coupler extending from the mesh support and coupled to at least one modular construction block via coupling of the at least one complementary coupler to the at least one coupler.

[0009] In an embodiment, a method of constructing rockwork includes steps of forming a support structure comprising at least one modular construction block, activating couplers of the at least one modular construction block, and coupling an exterior shaped piece comprising a mesh support and a plurality of complementary couplers to the at least one modular construction block via the activated couplers, such that the exterior shaped piece is disposed at least partially around the support structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] These and other features, aspects, and advantages of the present disclosure will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0011] FIG. 1 is an illustration of a themed rockwork system of an amusement park, according to embodiments of the present disclosure;

[0012] FIG. 2 is a cross-sectional view of a portion of a rockwork system, according to embodiments of the present disclosure;

[0013] FIG. 3 is a cross-sectional view of modular construction blocks of the portion of the rockwork system of FIG. 2, according to embodiments of the present disclosure;

[0014] FIG. 4 is a perspective view of a modular construction block of a rockwork system, according to embodiments of the present disclosure;

[0015] FIG. 5 is a cross-sectional view of modular construction blocks with couplers in a first exemplary configuration, according to embodiments of the present disclosure; and

[0016] FIG. 6 is a cross-sectional view of modular construction blocks with couplers in a second exemplary configuration, according to embodiments of the present disclosure.

DETAILED DESCRIPTION

[0017] One or more specific embodiments will be described below. In an effort to provide a concise description of these embodiments, not all features of an actual implementation are described in the specification. It should be appreciated that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be appreciated that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure.

[0018] When introducing elements of various embodiments of the present disclosure, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

[0019] An amusement park may enhance a guest experience by providing themed environments. These themed environments may be established, at least in part, using themed structures situated in or around the amusement park, amusement rides, walkable areas, and the like, and may be positioned within view of the guest. Additionally, themed structures may provide support structure for attractions of the amusement park, such as amusement rides, elevated walkable areas, viewing platforms, and the like. For example, a themed structure may provide both support structure and a themed environment for an amusement ride traversing within or around the themed structure. Thus, themed structures may provide physical components of a themed environment. In certain cases, themed structures may provide fantastical narrative elements (e.g., volcanos, dinosaurs, alien environments) that involve irregular shapes and/or surfaces that cannot be formed with planar or right-angle configurations or conventional building materials.

[0020] Themed structures of an amusement park may be too large, heavy, or cumbersome to transport in one piece from a place of manufacture to an amusement park. Further,

because themed structures may have different shapes, forms, and sizes than those of conventional structures (e.g. conventional residential, commercial, or industrial structures), custom design and construction may be necessary. However, custom design and construction may be expensive, time-consuming, and technically error-prone. As such, techniques for constructing themed structures that allow for both standardization and flexibility to establish a themed environment are desired.

[0021] The disclosed embodiments provide a rockwork system that may form or be part of a themed structure. In certain cases, themed structures may be built using one or more rockwork systems. The rockwork system may include an underlying support structure and an exterior shaped piece that may be referred to as a “chip”. The exterior shaped piece is designed to be positioned on or around the support and can be formed from shapeable or moldable materials that can be painted and/or otherwise designed. The exterior shaped piece may include the viewable themed portion of the structure while the support structure is not visible or only partially visible to an observer. The viewable themed portion may represent, as examples, a rocky exterior of a volcano or a cobblestone façade of a building.

[0022] While certain rockwork-based techniques use custom-built support structures as well as custom-built chips, custom building a support structure is cumbersome. Provided herein are rockwork systems that include modular building components that can be assembled together to form a support structure that can in turn be coupled to an exterior shaped piece. The rockwork system may include a one or more modular construction blocks that may include one or more couplers (e.g., connectors) that may couple to one or more complementary couplers of the exterior shaped piece. Each of the modular construction blocks may include one or more couplers associated with a portion (e.g., terminal portion, outer portion, end portion, receiving portion) of the support structure that receives the exterior shaped piece, the blocks may be assembled in any order and without specifying a terminal modular construction block that receives the exterior shaped piece. Thus, on-site assembly of the support structure is simplified. Terminal modular construction blocks that directly couple to the exterior shaped piece may have their

couplers in an active configuration, while interior blocks may have their couplers in an inactive configuration. The couplers in the active configuration may ease connection to the exterior shaped piece, while the couplers in the inactive configuration may ease connection to other interior blocks. Thus, the plurality of modular construction blocks may include terminal modular construction blocks, and a subset of the couplers of the terminal modular construction blocks may be in the active configuration. The exterior shaped piece may include a mesh support and may provide aesthetic, structural, and/or protective benefits to the rockwork structure. The exterior shaped piece may include one or more complementary couplers, and the plurality of complementary couplers may couple to one or more terminal modular construction blocks via the couplers of the one or more terminal modular construction blocks, which, as mentioned, are in the active configuration.

[0023] In some embodiments, each modular construction block of the rockwork system has a shape selected from a set of three-dimensional shapes (e.g., cubes, rectangular prisms, triangular prisms, cylinders, cones, or pyramids). Further, certain blocks may have irregular and/or asymmetric shapes to facilitate forming angled surfaces, curves, or tunnels. The shape and/or size of each modular construction block may be selected such that, when the modular construction blocks are coupled to one another, the support structure may form and/or approximate a desired shape. This modularity may allow for eased manufacturing, procurement, and/or construction processes, as the use of custom-built components as a basis for a themed structure may be reduced or eliminated.

[0024] Further, the exterior shaped piece may be molded, fabricated, manufactured, or otherwise customized to fit the contours of the desired shape of the rockwork system. In an embodiment, the mesh support is formed from a material (e.g., rebar, alloy, metal composite, metal wiring, and so on) that is malleable, pliable, ductile, or otherwise mechanically flexible or shapeable to allow for fitting on or around the one or more terminal modular construction blocks of the rockwork system. The exterior shaped piece may also include a filler material disposed between, on, and/or around the mesh support, and the filler material may provide structural or protective properties for the exterior shaped

piece and the rockwork system. In embodiments, the filler material may be at least shotcrete, concrete, expanding foam, or a polymer fill. In an embodiment, the exterior shaped piece may have a backer layer (e.g., a fabric or plastic sheet) that contains the filler material from at least one side. For example, the backer layer may comprise and/or form a solid barrier against which the filler material is applied and/or the backer layer may form a surface that holds the filler material within the exterior shaped piece until the filler material is cured. Additionally, the exterior shaped piece may include exterior contours that are carved, molded, 3D printed, or otherwise formed and that contribute to a themed environment. For example, a rockwork system that represents a volcano may include an exterior shaped piece with rocky and/or jagged exterior contours.

[0025] As provided herein, the couplers of the modular construction blocks are used to connect the exterior shaped piece to the support structure. In embodiments, the couplers are not used to connect the blocks to one another. In some embodiments, each coupler of the plurality of couplers may be configured to maneuver (e.g., recess, adjust, translate, extend, rotate, articulate, pivot, flip, etc.) to allow for greater flexibility of the rockwork system. A coupler in the inactive configuration may, for example, be configured such that the coupler does not protrude from a first modular construction block, allowing the first modular construction block to make direct contact with a second modular construction block without the coupler interfering with the joining. A coupler in the active configuration, on the other hand, may be configured to extend beyond an individual modular construction block to contact a complementary coupler of the exterior shaped piece. Likewise, a complementary coupler may be configured to extend beyond the exterior shaped piece to contact a coupler of the plurality of couplers in the active configuration. As such, a modular construction block of the plurality of modular construction blocks may be coupled to the exterior shaped piece without necessitating direct contact between the exterior shaped piece and the modular construction block. Furthermore, because each coupler of the plurality of couplers may be configured to move between the active configuration and the inactive configuration, design of the rockwork system may not be

dependent on establishment of terminal modular construction blocks at the time of assembly.

[0026] Keeping the above in mind, FIG. 1 is an illustration of a themed structure of an amusement park comprising rockwork system 10. In the illustrated embodiment, the rockwork system 10 contributes to a themed environment by representing a themed landscape feature, and includes exterior shaped piece 8 representing a jagged, rocky exterior of a volcano, viewable by a guest of the amusement park from, for example, viewing area 9 or amusement ride 6. The rockwork system 10 may also provide an at least partially dark environment for amusement ride 4, which traverses through cavities of the rockwork system 10. Additionally or alternatively to aesthetic benefits, the rockwork system 10 may provide structural support. For example, the rockwork system 10 may provide structural support a passenger loading platform 2 and/or the amusement ride 4. Additionally or alternatively, the rockwork system 10 may provide protection from the environment. For example, protection from the environment may include full and/or partial sun cover, cover and/or shelter from rain, and/or cover and/or shelter from wind.

[0027] FIG. 2 illustrates a cross-sectional view of a portion of the rockwork system 10. The rockwork system includes exterior shaped piece 8 and a support structure 12. The support structure 12 may be formed from modular construction blocks, referred to collectively as modular construction blocks 20 and illustrated by way of example as modular construction blocks 23, 24, 25, 26, 27, 28, 30, 32, and 34. In the illustrated embodiment, modular construction blocks 23, 24, 25, 27, and 34 are terminal modular construction blocks. It should be noted, however, that in other embodiments, any of the illustrated modular construction blocks 20 may be terminal modular construction blocks. In the illustrated embodiment, modular construction blocks 26, 28, and 32 have the same first three-dimensional shape, and the modular construction blocks 25 and 30 have the same second three-dimensional shape. In some embodiments, modular construction blocks 20 of the same shape may also have the same coupler arrangements (e.g., coupler quantity, coupler location, distance between couplers, and so on), same materials, and so on. As

such, modular construction blocks 20 of the same shape may have similar manufacturing and/or procurement processes. Additionally, as described below, the illustrated modular construction blocks 20 may be coupled to one another as shown via suitable coupling techniques as part of the rockwork system 10.

[0028] While FIG. 2 illustrates a portion of rockwork system 10 having an uninterrupted set of modular construction blocks 20, in some embodiments, a rockwork system may omit one or more modular construction blocks 20 such that one or more cavities or tunnels are formed in the rockwork system 10. The one or more cavities may additionally or alternatively allow for functionalities of the amusement park such as walkways, staircases, heating, ventilation, and cooling (HVAC) areas, and so on. Additionally or alternatively, the one or more cavities may also allow space for one or more amusement rides, such as amusement ride 4 of FIG. 1, or vista opportunities, such as the one provided by the passenger loading platform 2 of FIG. 1. In addition, the one or more cavities may serve aesthetic purposes that contribute to a themed environment; a cavity may contribute to a bear's den, a cave hideout, a villain's lair, or an abandoned mine, as examples.

[0029] FIG. 3 illustrates a cross-sectional portion view of modular construction blocks 32 and 34 of the rockwork system 10 illustrated in FIG. 2. In the illustrated embodiment, modular construction block 32 is formed as an open frame 50 with one or more crossbeams 46, and modular construction block 34 is formed as an open frame 42 with a one or more crossbeams 40. The illustrated couplers, referred to collectively as couplers 45, include a first group of couplers coupled to the open metal frame 50, and a second group of couplers coupled to the open metal frame 42. Further, at least a subset 48 of the first group of couplers is in an inactive configuration that does not protrude to an exterior of the open frame 50 of the modular construction block 32. Likewise, at least a subset 44 of the second group of couplers is in the inactive configuration and does not protrude from the open frame 42 modular construction block 34. The inactive configuration of the subset 44 and the subset 48, respectively, may allow the open frame 42 and the open frame 50 to be coupled via mortar, fasteners, adhesive, dowels, welding, or any other suitable coupling

technique. In an embodiment, the inactive configuration of the subset 44 and the subset 48, respectively, may allow the open frame 42 and the open frame 50 to make contact. In some embodiments, a face of a modular construction block may have a surface, and, accordingly, “face” and “surface” may be used herein interchangeably.

[0030] FIG. 4 illustrates a perspective view of an individual modular construction block 20 have a box-like configuration. with a first face 51, a second face 52, and a third face 54 comprising one or more couplers 45. It should be noted that while modular construction block 20 is shown as a rectangular prism three-dimensional shape in the illustrated embodiment, modular construction blocks may have the form of any suitable three-dimensional shape, as described herein. It should also be noted that modular construction block 20 is presented as an individual modular construction block for illustrative purposes. Indeed, as illustrated in the aforementioned figures, the modular construction block 20 may be coupled to one or more modular construction blocks or exterior shaped pieces as part of a rockwork system. Additionally, each of the faces of the modular construction block 20 may have any suitable number of couplers (e.g., 1 coupler, 2 couplers, 3 couplers, 4 couplers, 5 couplers, 10 couplers, 20 couplers, or more), and the number of couplers on each face may differ from one another. For example, the first face 51 may have five couplers 45, the second face 52 may have four couplers 45, and the third face 54 may have eight couplers 45. Further, modular construction blocks of a rockwork system need not be identical. For example, the modular construction blocks of the rockwork system may each have the form of varying three-dimensional shapes, may have varying arrangements of couplers, and so on.

[0031] In the illustrated embodiment, one or more couplers 56 are in an inactive configuration. The one or more couplers 56 may not protrude beyond the modular construction block 20, allowing contact or coupling between the modular construction block 20 and other modular construction blocks. Other couplers 53 and 55, on the other hand, are shown in an active configuration, such that they may couple with an exterior shaped piece, as described herein. It should be noted, however, that the couplers may

transition from an active configuration to an inactive configuration, or from an inactive configuration to an active configuration, as described herein.

[0032] In an embodiment, the transition from active to inactive configuration may be via a hinge coupling 57 to the block 20. The hinge coupling 57 may be in a first position to cause the coupler 45 to reposition, reorient, and/or extend away from the block 20 or a second position to cause the coupler 45 to be flush with or recessed within an open interior of the block 20. Other configurations are also possible. In an embodiment, the coupler 45 may be coupled to a threaded support. Further, turning the support in first direction may move the coupler 45 away from the block 20 and turning the threaded support in an opposite direction may move the coupler 45 towards or within the block 20. In an embodiment, a transition between active and inactive configurations may be mediated by elastic deformation (e.g., fully reversible deformation upon removal of a load) or plastic deformation of a material past its deformation point such that transition to the active configuration is a one-way transformation. Thus, the coupler 45 may be activated after the support structure 12 is assembled and the exterior shaped structure is ready to be received.

[0033] FIG. 5 shows a cross-sectional view of a modular construction block 58 joined to a terminal modular construction block 59, along with a first exterior shaped piece 63 and a second exterior shaped piece 65. In the illustrated embodiment, the modular construction block 58 has one or more inactive couplers 69 (e.g., couplers in an inactive configuration), and one or more active couplers 72 (e.g., couplers in an active configuration). Likewise, the modular construction block 59 has one or more inactive couplers 68 and one or more active couplers 66.

[0034] In the illustrated embodiment, the first exterior shaped piece 63 and the second exterior shaped piece 65 are configured to couple to the one or more active couplers 66 and 72, respectively, of modular construction blocks 59 and 58 via one or more complementary couplers 64 and 70, respectively. The exterior shaped piece 65 may include a mesh support 67, filler material 61, and/or one or more complementary couplers 70. Likewise, the exterior shaped piece 63 may include a mesh support 62, filler material 60, and/or one or

more complementary couplers 64. In some embodiments, the one or more complementary couplers 64 may be directly coupled (e.g., affixed) to the mesh support 62. Each complementary coupler of the one or more complementary couplers 64 may be configured to articulate with respect to the exterior shaped piece, and each active coupler of the one or more active couplers 66 may be configured to articulate with respect to the modular construction block 59. As such, connections between couplers of the rockwork system may be maneuvered (e.g., articulated) to allow for optimal positioning of exterior shaped pieces. For example, if the exterior shaped piece 65 interferes with a connection between the exterior shaped piece 63 and the modular construction block 59, the exterior shaped piece 63 may be maneuvered (e.g., to the right), such that the interference is cured. Maneuvering such that the interference is cured may include, for example, movement of the exterior shaped piece 63 such that contact, obstruction, blockage, and so on between the exterior shaped piece 63 and the modular construction block 59 is no longer present.

[0035] Additionally, the exterior shaped pieces 63 and/or 65 may have exterior (e.g., visible) contours that contribute to a themed environment. In the illustrated embodiment, filler materials 60 and 61 have been utilized (e.g., applied, deposited) such that the exterior surface of the exterior shaped pieces include uneven (e.g., rocky, jagged) exterior contours that may, for example, form the exterior of a volcano, such as the one represented by the rockwork system 10 of FIG. 1. In other embodiments, exterior contours may form a flat exterior, a smooth exterior, a patterned exterior, and so on, that may contribute to varying themed environments. In some embodiments, a mesh support of an exterior shaped piece, or both the mesh support and a filler material of the exterior shaped piece, may include the exterior contours. In any case, exterior shaped pieces, such as exterior shaped pieces 63 and 65, may provide aesthetic contributions to a themed environment in addition to the structural contributions mentioned herein.

[0036] In some embodiments, the exterior shaped pieces 63 and 65 may be replaced by a singular exterior shaped piece having a combined form, coupler configuration, and so on, of the exterior shaped pieces 63 and 65. In other embodiments, the exterior shaped pieces

63 and 65 may be partitioned into three or more exterior shaped pieces that, when part of a rockwork system, have the same form and/or configuration as the illustrated exterior shaped pieces. That is, while the illustrated embodiment presents two exterior shaped pieces, a rockwork system may include any suitable quantity of one or more exterior shaped pieces (e.g., 1, 2, 5, 10, 50, 100, and so on exterior shaped pieces). Further, each exterior shaped piece of the one or more exterior shaped pieces may have any suitable quantity, location, and configuration of one or more couplers. Additionally or alternatively, each exterior shaped piece of the one or more exterior shaped pieces may couple to any suitable number, subsets, or portions of terminal modular construction blocks. In any case, the modularity and flexibility of the modular construction blocks and their respective couplers allows for various arrangement options of the one or more exterior shaped pieces.

[0037] With the above in mind, a method for constructing rockwork may include forming a support structure with at least one modular construction block (e.g., the modular construction blocks 58 and 63). The method may also include activating couplers of the at least one modular construction block, and coupling an exterior shaped piece (e.g., the exterior shaped piece 63) including a mesh support (e.g., the mesh support 62) and a plurality of complementary connectors (e.g., the complementary connector 64) to the at least one modular construction block via the activated couplers, such that the exterior shaped piece is disposed at least partially around the support structure.

[0038] FIG. 6 illustrates modular construction blocks 76, 78 having actuatable couplers 45. Actuatable couplers 45 may include active couplers and/or actuatable couplers 45 may include inactive couplers. In particular, modular construction block 76 may include one or more active couplers (e.g., active coupler 90) and one or more inactive couplers (e.g., inactive coupler 96) that maneuver via one or more rail assemblies (e.g. rail assembly 94). For example, in the illustrated embodiment, the active coupler 90 may extend or retract with respect to (e.g., relative to) the modular construction block 32 via rail assembly 94. As such, the active coupler 90 may, for example, extend to change orientation and allow coupling with a complementary coupler 88 of an exterior shaped piece 65. Further, the one

or more rail assemblies may be used to maneuver (e.g., retract, translate) and/or change orientation the one or more active couplers or at least a portion of the one or more active couplers (e.g., end of at least one coupler of the one or more active couplers, section of at least one coupler of the one or more active couplers, component of at least one coupler of the one or more active couplers) such that they enter an inactive configuration (e.g., not protruding from a modular construction block) or maneuver (e.g., extend, rotate, reorient, actuate) the one or more inactive couplers or at least a portion of the one or more inactive couplers (e.g., end of at least one coupler of the one or more inactive couplers, section of at least one coupler of the one or more inactive couplers, component of at least one coupler of the one or more inactive couplers) such that they enter an active configuration (e.g., protruding from the modular construction block). At least a portion of the active coupler 90 may, for example, extend (e.g., slide) to allow coupling with a complementary coupler 88 of an exterior shaped piece 65. The inactive coupler 96, for example, may be retracted via a rail assembly of the one or more rail assemblies such that it does not protrude from the modular construction block 32, allowing coupling and/or contact between modular construction block 32 and other modular construction blocks using above-mentioned techniques. Additionally or alternatively, the retraction of the inactive coupler 96 via the rail assembly may obviate interference of the inactive coupler 96 and/or the modular construction block 32 with other modular construction blocks.

[0039] Further, in the illustrated embodiment, the one or more active couplers may maneuver via one or more ball joints, allowing rotation of the one or more active couplers in one or more planes with respect to a modular construction block. Additionally, a ball joint of the one or more ball joints may be used as part of, or in conjunction with, a rail assembly of one or more rail assemblies to allow both rotational and translational movement of a coupler and/or a portion of a coupler (e.g., end of a coupler, section of a coupler, component of a coupler). The active coupler 90, for example, may maneuver via both the rail assembly 94 and the ball joint 92, allowing extension, retraction, translation and/or rotation in one or more planes (e.g., at least a first and second plane, three or more planes). As such, maneuvering to couple the active coupler 90 and a complementary

coupler 88 may accommodate a wider range of manufacturing tolerances and/or a wider range of assembly tolerances and/or a wider range of tolerance stackups. For example, including maneuverable couplers may allow for greater range of manufacturing tolerances, assembly tolerances, and/or tolerance stackups of individual components and/or tolerance stackups of combinations of components of the rockwork system. For example, including maneuverable couplers may allow for greater range of manufacturing tolerances, assembly tolerances, and/or tolerance stackups between the coupler 90 and the complementary coupler 88.

[0040] While ball joints and rail assemblies are illustrated in FIG. 6, in some embodiments, other connection techniques may be used as part of, or in conjunction with, the one or more active couplers and/or the one or more inactive couplers. Couplers (e.g., active couplers, inactive couplers) may comprise hinges, socket joints, universal joints, flexible couplings, linkages, telescoping joints, adhesives, any other suitable coupler configuration, or any combination thereof. A coupler configuration may be optimized, designed, and/or chosen for each coupler of a rockwork system based on, for example, a construction process, a part procurement process, regulatory standards, structural integrity, and so on, and each coupler configuration may aid in maneuvering a corresponding coupler. Optimizing a coupler configuration may include optimizing for space, cost, construction time, performance, and/or other suitable reasons.

[0041] Further, the actuatable couplers 45 may include one or more actuators, and maneuvering (e.g., activating or deactivating) the actuatable couplers 45 may comprise actuating the one or more actuators. Actuation of the one or more actuators may include extending, repositioning, and/or reorienting of an end of an actuator, and actuation may include linear actuation and/or rotating actuation. Actuators may include, for example, hydraulic actuators, pneumatic actuators, electronic actuators, magnetic actuators, and/or mechanical actuators. Additionally, a rockwork system may include a controller, and actuating the actuators may be initiated via the controller. For example, the controller may

send instructions to the one or more actuators to actuate (e.g. to activate one or more of the actuatable couplers 45.

[0042] While only certain features of the invention have been illustrated and described herein, many modifications and changes will occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

[0043] The techniques presented and claimed herein are referenced and applied to material objects and concrete examples of a practical nature that demonstrably improve the present technical field and, as such, are not abstract, intangible or purely theoretical. Further, if any claims appended to the end of this specification contain one or more elements designated as “means for [perform]ing [a function]...” or “step for [perform]ing [a function]...”, it is intended that such elements are to be interpreted under 35 U.S.C. 112(f). However, for any claims containing elements designated in any other manner, it is intended that such elements are not to be interpreted under 35 U.S.C. 112(f).

CLAIMS:

1. A rockwork system, comprising:
 - a support structure comprising:
 - a plurality of modular construction blocks comprising at least one terminal modular construction block forming an exterior face of the support structure, the at least one terminal modular construction block comprising a first coupler in a first coupler active configuration; and at least one additional modular construction block coupled to the at least one terminal modular construction block, the at least one additional modular construction block comprising a second coupler in a second coupler inactive configuration; and
 - at least one exterior shaped piece comprising a mesh support, wherein the at least one exterior shaped piece is disposed at least partially around the support structure and is coupled to the first coupler of the at least one terminal modular construction block via a complementary coupler.
2. The rockwork system of claim 1, wherein the at least one terminal modular construction block and/or the at least one additional modular construction block comprises a shape selected from a set of three-dimensional shapes.
3. The rockwork system of claim 2, wherein the set of three-dimensional shapes comprises at least cubes, rectangular prisms, triangular prisms, cylinders, cones, or pyramids.
4. The rockwork system of claim 2, wherein the at least one additional modular construction block comprises a first modular construction block and a second modular construction block having a same shape and size relative to one another.

5. The rockwork system of claim 1, wherein the second coupler is recessed in the second coupler inactive configuration.
6. The rockwork system of claim 1, wherein the first coupler is configured to transition from the first coupler active configuration to a first coupler inactive configuration.
7. The rockwork system of claim 1, wherein the first coupler is configured to articulate with respect to the at least one modular construction block.
8. The rockwork system of claim 1, wherein the second coupler is configured to transition from the second coupler inactive configuration to a second coupler active configuration.
9. The rockwork system of claim 1, wherein the second coupler is configured to protrude from the at least one additional modular construction block in a second coupler active configuration.
10. The rockwork system of claim 1, wherein at least a portion of the first coupler or at least a portion of the second coupler is configured to transition between a first position or orientation and a second position or orientation.
11. The rockwork system of claim 1, wherein the plurality of modular construction blocks is coupled together via welding and/or fasteners.
12. A rockwork structure, comprising:
 - at least one modular construction block comprising at least one coupler; and
 - an exterior shaped piece comprising a mesh support disposed around the at least one modular construction block, wherein the exterior shaped piece comprises:
 - a mesh support;

a filler material disposed within the mesh support; and
at least one complementary coupler extending from the mesh support and coupled to at least one modular construction block via coupling the at least one complementary coupler to the at least one coupler.

13. The rockwork structure of claim 12, wherein the at least one modular construction block comprises a rail assembly coupled to the at least one coupler.
14. The rockwork structure of claim 13, wherein at least one end of the at least one coupler is configured to translate along the rail assembly to adjust a position of at least one coupler relative to the at least one modular construction block.
15. The rockwork structure of claim 12, wherein the filler material comprises concrete, the mesh support comprises metal wiring, and the at least one complementary coupler is affixed to the metal wiring.
16. A method of constructing rockwork, comprising:
 - forming a support structure, the support structure comprising at least one modular construction block, the modular construction block comprising at least one or more couplers;
 - activating the one or more couplers of the at least one modular construction block; and
 - coupling an exterior shaped piece to the at least one modular construction block via the one or more activated couplers, wherein:
 - the exterior shaped piece comprises a mesh support and one or more complementary couplers; and
 - the exterior shaped piece is disposed at least partially around the support structure.

17. The method of claim 16, comprising:

adjusting a position or orientation of at least one portion of at least one coupler of the one or more couplers relative to the support structure to couple the at least one coupler to at least one complementary coupler of the one or more complementary couplers.

18. The method of claim 17, comprising:

wherein adjusting a position or orientation of the at least one portion comprises extending or sliding the at least one portion along a rail assembly towards the at least one complementary coupler of the one or more complementary couplers.

19. The method of claim 17, wherein adjusting a position or orientation comprises rotating the at least one portion.

20. The method of claim 19, wherein the at least one coupler is coupled to a ball joint.