A climate controlled practice facility comprises an enclosable building having an access door to permit into the building's interior, a pressurization unit for pressurizing the interior to a selected pressure differential, and a plurality of items located within the interior correlated to a selected sporting activity and arranged to simulate an appearance of at least a portion of a playing environment. In one embodiment, the climate controlled practice facility is a baseball practice facility for acclimating players to selected playing conditions. Here, a practice region is located within the enclosure interior and includes a pitching station and a batting station spaced apart therefrom. Players may enter the enclosure and practice for an interval of time while being exposed to a set of metrological conditions, such as pressure, temperature and humidity, that are regulated by a climate controlled system. A method of practicing a selected sporting activity is also provided.
ABSTRACT

A climate controlled practice facility comprises an enclosable building having an access door to permit into the building's interior, a pressurization unit for pressurizing the interior to a selected pressure differential, and a plurality of items located within the interior correlated to a selected sporting activity and arranged to simulate an appearance of at least a portion of a playing environment. In one embodiment, the climate controlled practice facility is a baseball practice facility for acclimating players to selected playing conditions. Here, a practice region is located within the enclosure interior and includes a pitching station and a batting station spaced apart therefrom. Players may enter the enclosure and practice for an interval of time while being exposed to a set of metrological conditions, such as pressure, temperature and humidity, that are regulated by a climate controlled system. A method of practicing a selected sporting activity is also provided.
CLIMATE CONTROLLED PRACTICE FACILITY AND METHOD UTILIZING THE SAME

FIELD OF THE INVENTION

The present invention is broadly directed to the field of climate controlled facilities in which meteorological conditions can be selectively varied. The present invention more specifically concerns pressure regulated practice facilities for use in acclimating participants in sports-related activities to varying climatic conditions, as well as methodologies for achieving the same.

BACKGROUND OF THE INVENTION

Many types of modern day sporting activities owe their origins to more ancient civilizations and have evolved over the centuries to their present day manifestations, while others have evolved from the devices of man’s imagination as a means to achieve self-fulfillment, compete with others, or simply pass the time. It seems, in fact, that a different sport or recreational activity is created almost everyday, and this is not surprising since human beings have an innate need to compete with one another.

Regardless of whether a sport is played at an individual level or team level, optimal performance is achieved through repetitive practice and, for many individuals, this begins at an early age. While, for most of us, sports provides an enjoyable extra-curricular activity, for many professional athletes throughout the world it is the career by which they make a living. For these individuals, proficiency at one’s forte is essential to remain competitive and hopefully increase longevity. One sport which has achieved widespread popularity throughout North America and other parts of the world is baseball. Perhaps more than any other team sport, success is integrally dependent upon various factors, such as individual and team skill, coaching ability, playing conditions, and a certain percentage of luck, to name
only a few. It is this unique combination of factors which attributes to the sport's popularity and enjoyment from the viewpoint of both players and spectators.

As a result of its widespread popularity, baseball is played at a variety of different locations throughout the world in either indoor or outdoor venues each having a unique set of playing conditions. These include the characteristics of the particular playing field and weather conditions, each of which can vary throughout the year such that every game presents a different set of circumstances, and teams vary their rosters accordingly.

The old saying that "Baseball is a game of inches" succinctly characterizes many facets of the game. For both players and coaches, understanding the dynamics of ball movement can be critical to success. This is particularly true for pitchers who have at their disposal an arsenal of pitches which may be thrown depending on the particular situation. The four seam fastball, for example, will move up and in (or out) depending in part on the pitcher's arm angle at release. In throwing the four seam fastball, a pitcher will attempt to paint the inside or outside of the plate from sixty feet away, a rather daunting task for the layperson. If he is mere inches off, then he may walk a batter, or worse, leave the ball in the middle of the plate and risk that it will be hit out of the park. The low outside curve ball, for example, similarly requires such accuracy. This pitch requires the ball to be placed approximately within a 4" X 9" imaginary box extending from the outside of the plate to inside it's corner at an approximate height that is roughly from the middle of the batter's thigh to his knee, again all from sixty feet away. From the batter's perspective, the game of inches is equally challenging. Within the brief amount of time between when the ball leaves the pitcher's hand until it crosses the plate, the batter attempts to recognize the type of pitch, determine whether it will be a strike or
ball, and react accordingly. Aside from such things as player skill, player confidence and coaching strategy, prevailing environmental conditions can also have a significant impact on the outcome of a game. Temperature, for instance, can affect how a baseball moves and it is known that the ball moves different at nighttime than during the heat of day. Prevailing wind conditions can also significantly affect the movement of the ball after it is released by the pitcher, as well as it's trajectory and distance of travel when hit. Another factor affecting ball movement is air density. The air's density depends on temperature, pressure and the amount of water vapor that is present. Ignoring the effects of water vapor for the time being, it is known that the air's density decreases in the free atmosphere as the air is heated. Pressure has the opposite effect -- increasing the pressure increases the air's density. Altitude and weather systems can also change the air's pressure, although altitude has a greater impact. Air density is relatively low, for example, at a high elevation such as Denver, Colorado on a hot day when the atmospheric pressure is low and a storm is moving in. In contrast, the air's density is relatively high at low elevations when the pressure is high and the temperature is low, such as a sunny but cold winter day in Alaska. When the amount of water vapor is factored into the equation, we see that the air becomes lighter as more water vapor is added to it. Accordingly, humidity also plays a role.

Air density can, thus, affect the flight of a baseball. More dense or "heavier" air will slow down the ball which, in effect, must displace more or heavier molecules as it travels. The collision of air molecules with the baseball creates "drag" or friction that slows the ball down, and such air resistance increases with air density. Baseball players have found that homeruns travel farther in less dense air, such as the high-altitude conditions of Denver, than in venues at lower elevations. This is because
the reduced drag in Denver slows the ball down at a slower rate, allowing it to travel further. By contrast, since more air molecules are packed into a given volume at New York City than Denver, more collisions occur between air molecules and the baseball. As a result, the baseball slows down more quickly in New York City than in Denver, decreasing it's distance of travel accordingly.

It can be appreciated then that baseball players need to have some awareness of the effects of air density and other prevailing environmental conditions in order to perform proficiently. Thus, in addition to maintaining their confidence and level of skill, ball players must be quite versatile to adjust adequately to varying climate conditions. This is particularly true for baseball players whose home venue is in a high altitude locale such as Denver, Colorado. These players play many of their games in high altitude conditions but must regularly re-adjust to lower altitude conditions throughout the season. While this can present problems for the players in general, it is particularly exacerbated for the pitchers who are more prone to injuries as they often adjust their throwing mechanics in preparation for and throughout a game to compensate for different altitude conditions. For example, pitchers can develop arm problems while trying too hard to overcome the density issue by spinning the ball harder in an effort to achieve their "normal" amount of break, and by "overthrowing" for more velocity. Not only does this present physical challenges for the pitchers, but their success or failure at making these adjustments can also affect them psychologically. While, at one time or another, most pitchers face the dilemma of adjusting their mechanics for varying altitude conditions, those hailing from high-altitude venues must do so more regularly since the nature of their schedule is more grueling in this regard. Similarly, batters also need to adjust their swing mechanics
since the same pitch will move differently depending on whether it is thrown at sea level or at high-altitude.

In the past, one approach which has been employed in an effort to simulate different types of ball movement, such as that experienced at different altitudes, is the use of a pitching machine which can adjust the speed and spin of a baseball. However, while a pitching machine located at one elevation can somewhat impart differing flight trajectories to a baseball akin to what might be experienced at a different elevation, the visual experience for the batter is not realistic because the speed and spin of the ball have been adjusted to achieve this. Another drawback is that, while pitching machines may assist batters in practicing their mechanics, they do not address the important need for pitchers to practice throwing under different altitude conditions.

Accordingly, it is desirable to provide a new approach for acclimating sports participants more regularly to the varying climate conditions which they may encounter so they will be better equipped to handle challenging situations. To this end, there is a need for a new climate controlled practice facility in general, and a pressure regulated training facility in particular, so that sports participants can prepare themselves for participating in venues having differing pressure characteristics. While this need can be particularly addressed with regard to a training facility constructed for the purpose of exposing baseball players to varying climate conditions (such as pressure, temperature and humidity), there is a more global need to provide the capability for training participants of other sports-related activities, including basketball, track and field events, tennis and a plethora of others in which participants could derive a benefit. One such activity might include, for example, using a climate controlled facility to simulate the altitude, temperature
and/or humidity level associate with a race venue for the purpose of adjusting and calibrating race cars. There is a further need to provide a methodology for training participants in sports-related activities to acclimate them to one or more variable environmental conditions. The present invention is suitably directed to addressing this need.

Regulating pressure in an enclosure is not new. Buildings today, for example, are designed to maintain a slightly positive internal pressure of +0.05" to +0.10" water column (wc) relative to the outdoor environment because it is better to have clean, conditioned air leaking out of buildings rather than dirty, unconditioned air leaking in. Most buildings today actually operate under either a slight negative or slightly positive relative pressure in the range of −0.10" wc to +0.10" wc. In extreme cases, when fans and dampers fail to operate properly, buildings can see negative or positive pressure extremes in the range of −0.50" wc to +0.50" wc. This corresponds to a pressure differential range of approximately -0.018 psi to +0.018 psi. Greater pressure differences are known for mobile aircrafts, such as commercial airplanes, which are pressurized during flight since they travel at high altitudes. Other constructions known as hyperbaric chambers are used to place divers under increased pressure simulating an aqueous environment to help address injuries resulting from arterial gas embolism or decompression sickness. Another immobile structure which is marketed specifically to athletes is known as a high-altitude or “hypobaric” chamber which can safely simulate a high-altitude environment up to 15,000 ft. These are essentially sleeping chambers to permit athletes to acclimate themselves to sleep at high altitude without traveling and without experiencing the effects of altitude sickness. However, these immobile facilities are confining and, while they are capable at exposing individuals to varying altitude conditions, they are
not constructed of a sufficient size or in any way designed to permit an athlete to practice or train at a given sport.

**SUMMARY OF THE INVENTION**

It is an object of the present invention to provide a new climate controlled practice facility.

Another object of the present invention is to provide a climate controlled practice facility that is particularly suited for exposing and acclimating participants of sports-related activities to a desired set of meteorological conditions.

A further object of the present invention is to provide such a climate controlled practice facility which is sized and configured to accommodate either a few or many users, such as baseball players, basketball players or other sports participants.

Still another object of the present invention is to provide such a climate controlled practice facility in which the meteorological conditions can be selectively varied to any of a plurality of setting combinations, thereby to simulate the playing environment associated with selected geographic regions of interest.

Yet another object of the present invention is to provide a method of practicing a selected sporting activity, such as baseball, in an environment having climatic conditions associated with a geographic region of interest.

In accordance with these objectives, both a climate controlled practice facility and a methodology are provided for simulating meteorological conditions so that one or more users can acclimate themselves to climatic conditions while practicing a sports-related activity. The climate controlled practice facility of the present invention comprises an enclosable building which includes a plurality of walls joined together to substantially surround a building interior, and at least one building access door. The building's access door is operative in an open position to permit passage between an external environment and the building interior, while enclosing the
interior and isolating it from the external environment when in a closed position. The facility also includes a pressurization unit in communication with the building's interior and selectively operative upon activation to pressurize the interior of the building. Preferably it is capable of achieving a selected pressure differential between the interior and the external environment that is in a range of 0.02 psi to 7 psi, inclusively. A plurality of items correlated to a selected sporting activity are located within the interior and are arranged to simulate an appearance of at least a portion of a playing environment associated with the selected sporting activity.

The practice facility may also include vestibule projecting exteriorly of the building and accessible from the interior through the building's access door. This vestibule includes a vestibule access door operative in an associated open position to permit passage between the external environment and the vestibule, and operative in an associated closed position to isolate the vestibule from the external environment. Preferably, the building's first access door and vestibule access door are each adapted to be placed in respective locked and unlocked states and are electromechanically coupled to one another so that these locked and unlocked states can be simultaneously controlled. Preferably also, the building's access is of the water impermeable marine type such as those commonly found on commercial ships and the like. The building may also include similarly constructed second access door spaced apart from the first access door. This second access door can be placed in an associated open and closed positions to, respectively, permit passage between the external environment and the interior and isolate the interior from the external environment.

The building's walls may be formed by a plurality of wall panels joined together in a sealed arrangement, with the walls constructed of a material
composition, such as concrete, steel or aluminum, which is capable of withstanding the pressure differential without significant structural deformation. Further, the building for the practice facility may be supported above ground level, below ground level or partly buried below ground.

In order to achieve the pressure differential discussed above, a pressurization unit is provided which may be disposed either inside or outside the building. When located exteriorly of the building, a conduit interconnects the pressurization unit and the interior, thereby establishing fluid communication therebetween. An air handling unit is preferably disposed in the interior in communication with the pressurization unit and operates upon receipt of pressurized air from the pressurization unit to circulate the pressurized air through the building's interior, as well as provide heating, cooling, humidification, dehumidification and filtration to the interior.

The enclosure/building for the practice facility of the present invention is sized and adapted to accommodate a plurality of participants and can be constructed in a variety of different geometric configurations including a domed configuration having either a circular, oval, elliptical or rectangular base, or a cylindrical configuration, to name only a few. Where a rectangular base is employed for the enclosure, it includes opposed pairs of longitudinally and transversely extending sidewalls with adjacent ones of these sidewalls joined by arcuate corner sections each formed at an appropriate radius of curvature. Indeed, for any of the enclosure's configurations, it is preferred that the wall junctions thereof be either straight or curved and without angled edges to enhance the enclosure's structural integrity.

A variety of meteorological conditions can be regulated within the enclosure's interior. For purposes of the description to follow, a selected set of meteorological conditions can be controlled. The term "set" should be understood to include at least
pressure and may additionally include temperature and humidity. To this end, the practice facility preferably includes a programmable climate control system for regulating the set of meteorological conditions, each to a desired setting level. As such, the climate control system may include cooling system, a heating system, a pressurization system, a filtration system, and a programmable control station.

One particular embodiment for the practice facility of the present invention is suitable for acclimating baseball players to selected playing conditions. In this embodiment, the enclosure has an accessible dome-like configuration which includes a base, a surrounding perimeter wall extending upwardly therefrom and a domed roof supported by the perimeter wall to surround an enclosure interior. Here, at least one, but preferably a plurality, of practice regions are located within the enclosure's interior.

Each practice region preferably includes a pitching station having a pitching mound and a batting station having a batter's box which is spaced therefrom a selected distance corresponding to that found in a professional baseball playing field. Each practice region resembles an appearance of a portion of the baseball playing field so players, such as pitchers, batters and catchers may enter the enclosure through it's access door and practice for a selected interval of time while being exposed to the set of meteorological conditions. The practice regions are distributed equiangularly around a center of the enclosure and separated from one another by a respective partition member extending radially outward away from the center. An observation tower is centrally disposed within the interior of the dome-like enclosure and projects upwardly from its base toward the domed roof. This region may also support an equipment room which houses the necessary equipment for the climate control system. The observation tower is preferably cylindrical in
configuration and the facility also preferably includes an inner circumferential wall spaced radially inward from the perimeter wall to provide a circumferential walkway within the enclosure’s interior. Windows may be provided within the inner circumferential wall to provide additional observation locations. The partition walls extend between the observation tower and the inner circumferential wall so that each of the practice regions assumes a generally triangular configuration.

The present invention also provides a method of practicing a selected sporting activity, such as baseball or basketball to name a few. According to this methodology, a climate controlled enclosure is provided having an interior which is sized and adapted to accommodate a plurality of participants of the sporting activity. A pressure differential preferably in the range discussed above is created between the interior and an outside environment. Before or after this is done, participants enter into the enclosure’s interior and thereafter seal it from the outside environment. Thereafter, the participants practice the sporting activity for an interval of time.

As desired, the pressure, temperature and humidity of the interior can be periodically adjusted to different settings. It is preferred that ingress into the facility be prevented during the interval of time in which the players are practicing. The enclosure’s interior, in addition to the practice areas discussed above, may also have a decompression area adapted to be placed in isolation from the practice areas. Once practice is completed, players can exit the practice area and enter into the decompression area which is adapted to be isolated from the enclosure’s interior. Thereafter, pressure within the decompression area can be adjusted to a level corresponding to that of the outdoor environment, after which the players exit the decompression area to the outdoor environment.
These and other objects of the present invention will become more readily appreciated and understood from a consideration of the following detailed description of the exemplary embodiments of the present invention when taken together with the accompanying drawings, in which:

**BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a perspective view, partially cut away, illustrating the construction of a climate controlled practice facility according to a first exemplary embodiment of the present invention;

Figure 2 is a front view in cross-section generally illustrating the facility of Figure 1 and particularly showing its foundational support;

Figure 3 is a diagrammatic top plan view of the practice facility according to the first exemplary embodiment;

Figure 4 is a diagrammatic view illustrating some of the principal components for the meteorological control system for the practice facility according to the first exemplary embodiment;

Figure 5 is a perspective view generally illustrating the geometric configuration for a climate controlled practice facility according to a second exemplary embodiment of the present invention;

Figure 6 is a plan view generally illustrating the layout for the practice facility according to the second exemplary embodiment;

Figure 7 is a partial side view in elevation and in cross-section of the practice facility shown in Figures 5 and 6, with the domed roof removed;

Figure 8 is a plan view which diagrammatically illustrates the layout for a climate controlled practice facility according to a third exemplary embodiment of the present invention;
Figure 9 is a plan view which illustrates the general layout for a climate controlled practice facility according to a fourth exemplary embodiment of the present invention; and

Figure 10 is a plan view which generally illustrates the layout for a climate controlled practice facility according to a fifth exemplary embodiment of the present invention

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

Various embodiments are provided for a climate controlled practice facility which can accommodate a few or many users. A first exemplary embodiment of such a facility is described with reference to Figures 1-4. With initial reference to Figure 1, it may be seen that the climate controlled practice facility 10 according to the first exemplary embodiment is sized to only accommodate a few users, such as a pitcher, batter and a catcher. Practice facility 10 includes a tubular enclosure 12 supported relative to a support surface 2. Enclosure 12 is configured as a cylindrical shell to include an elongated cylindrical sidewall 14 and a pair of domed shaped end walls 16 and 18 which could alternatively be flattened in shape and which are disposed on opposed ends of cylinder 14 thereby to surround an enclosure interior 20. Entry into the enclosure’s interior 22 is provided by vestibule 23 which respectively extends from first and second end portions 17 and 19 of enclosure 12 proximate to its dome-shaped end walls 16 and 18. Also situated on support surface 2 exteriorly of enclosure 12 is a housing 24 for containing various mechanical and electrical equipment used in running practice facility 10, as will be discussed more thoroughly below.

Since practice facility 10 is climate controlled so that at least the pressure within interior 20 can be selectively varied to simulate different altitude conditions, it is necessary that the enclosure’s walls be constructed of material capable of
withstanding pressure differentials between interior 20 and the external environment. More particularly, it is preferred that enclosure 12 be capable of withstanding internal pressure ranging from sea level to approximately 15,000 ft in elevation, thus representing pressure differentials between the interior and the outside that have an absolute value in a range of approximately 0.02 psi to 7 psi, inclusively. Various types of material compositions such as steel, concrete and aluminum could be employed to accomplish this. However, for reasons of cost and structural integrity, an appropriate grade of sheet steel, such as ASTM Grade A-36 or better, would be preferred for enclosure 10 with a 1" urethane foam exterior. The particular composition for the enclosure's walls as well as their thicknesses, etc., would be well within the purview of the ordinarily skilled structural engineer so that the precise details for the particular constructions for the enclosures of the present invention in each of the embodiments discussed herein need not be explained in great detail. Indeed, it would likely be necessary to construct the various walls for the enclosure 12 out of a plurality of wall panels which are appropriately joined together in a sealed arrangement to prevent pressure dissipation. For purposes of this invention, the term "sealed arrangement" means that the walls are constructed for the purpose of preventing leakage of pressurized air through the enclosure, although the seals need not be completely leak proof since some seepage may exist and since adequate pressurization of the interior can still be obtained by compensating for this.

In Figures 1 and 2, it may be seen that climate controlled practice facility 10 according to the first exemplary embodiment is supported partly above a support surface 2. As best viewed in Figure 2, it is preferred that a portion of the facility's enclosure 12 be situated in a trough-shaped foundation 4 below ground level 5. While there are a variety of ways that a structural engineer might accomplish this,
one such manner as shown in Figure 2 is to situate enclosure 12 in a sand bedding 8 that is interposed between the enclosure 12 and the undisturbed foundation soil 6. A concrete slab 9 may then be situated at ground level 5 to provide some lateral support to enclosure 12 as well as a support surface for vestibule structures 22, 23 and housing 24.

Figure 3 shows a diagrammatic plan view of the climate controlled practice facility 10 according to the first exemplary embodiment in order to illustrate the electrical and mechanical systems which may be used therewith as well as to show in somewhat greater detail the particular structural features thereof. As stated above, a pair of vestibules 22 and 23 are preferably provided to provide ingress into and egress out of the facility's enclosure 10. While, theoretically, only one such vestibule structure need be provided to accomplish the purposes of the present invention, two exits may be required by applicable building codes. Each of vestibules 22 and 23 projects outwardly from the enclosure's surrounding sidewall 14, and access to the vestibules from the ambient environment is provided by vestibule access doors 26 and 28, respectively. Each vestibule 22 and 23 communicates with the enclosure's interior 20 by way of first and second enclosure access doors 27 and 29, respectively. Since enclosure 12 will be pressurized during use to a variety of pressure differential levels between its interior 20 and the ambient environment, the vestibule access doors 26, 28 and the enclosure's first and second access doors 27 and 29 would necessarily need to withstand the pressure differentials with a reduced risk of leakage. To this end, wheel activated water tight, steel marine doors could be used which are readily available. Alternatively, composite aluminum doors, such as those conventionally found on aircraft, could be used but these might be cost prohibitive. These represent only two such examples
of doors which may be used for the enclosure 12, but the present invention should not be limited as such.

As stated above, a separate housing enclosure 24 is provided to contain the various electrical and mechanical equipment used to run the practice facility 10. To this end, housing 24 can take on a variety of structural configurations and, of course, need not be built to withstand pressure differentials since it is external of enclosure 12. One such possible arrangement for housing 24 is shown in Figure 3 to include a plurality of rooms to house the necessary equipment. For example, a pressurization equipment room 30, an electrical equipment room 31 and a mechanical equipment room 32 may be provided each accessible by an associated access door 33-35, respectively.

A pressurization system 40 is provided to adjust the air density within the enclosure's interior 20. This pressurization system 40 preferably includes a centrifugal pressurization fan 42 having an intake 43, such as a 24" x 24" outside air louver with 2" FARR 30/30 filters, for drawing atmospheric air. The fan operates to compress this air to a particular level corresponding to the desired air density for the interior 20 of enclosure 12. This compressed air is then discharged from the fan 42 through a conduit 44 which interconnects fan 42 to an air handling unit 46 situated within the enclosure's interior 20. Due to pressure considerations, conduit 44 is preferably a 14 " welded steel pipe or other appropriate piping that is ducted through the enclosure's sidewall 14 with appropriate weld connections to prevent leakage. Since the compressed air produced by fan 42 will have an increased temperature relative to the ambient air drawn from outside the enclosure, it is preferred to cool the compressed air somewhat before circulating it within the enclosure 12. Accordingly,
an air handling unit 46 is provided, which is in essence an air conditioning and heating unit for conditioning the air from fan 42.

As shown in Figure 3, conduit 44 interconnects the pressurization fan 42 to the air handling unit’s return air plenum 48. As also shown in Figure 2, the return air is provided by a plurality of return air ducts 50, 52 and 54 which extend lengthwise below the enclosure’s floor 15 between the air handling unit’s return air plenum 48 and return air grating 56 which may be placed above the floor 15 at the enclosure’s opposite end. The cylindrical sidewall 14 for this embodiment of the climate controlled practice facility 10 preferably measures approximately 30 ft in diameter and 100 ft in length. With this configuration, pressurization fan 42 may be a 20 HP motor, variable speed drive fan rated for 1,000 CFM at 72” wc pressure. Air handling unit 46 may be rated at 8,000 CFM with a hot water coil, a chilled water coil, and a constant speed 5 HP motor. A supply air grill measuring approximately 72” x 24” and having transition duct is preferably placed in front of the air handling unit 46. Of course, other types of pressurization systems and components therefore could be utilized without departing from the inventive concepts contained herein. This would be well understood by the ordinarily skilled mechanical engineer, and this holds true not only for practice facility 10 described in Figures 1-4 but for the various other facility configurations discussed herein. For example, once a mechanical engineer familiar with considerations of the desired static pressure for the enclosure, the desired volume of air to be driven by the pressurization system 40, and the expected leak rate for the enclosure, the various components for the pressurization system can be readily acquired or designed. Further, it should not take very long to pressurize the facility 10 since the enclosure has a relatively small volume and since the pressure differential between its interior and the ambient environment, is
relatively small. For instance, were the enclosure situated in Denver, Colorado and pressurized to achieve an internal air density corresponding to that of Atlanta, Georgia, which represents a pressure differential of approximately 2.1 psi, it is expected that this would take only approximately fifteen minutes to accomplish. In addition, the ordinarily skilled person would appreciate that negative pressure differentials could be created between the enclosure's interior and the outdoors. This would be accomplished by employing appropriate depressurization equipment so that, for example, a vacuum could be created within the enclosure's interior so that the internal pressure is less than that outside. This might prove useful were the facility physically located at a lower altitude, such as Atlanta, and one wished to create internal pressure conditions corresponding to those of Denver. Moreover, such depressurization capabilities could be used either in conjunction with or separate from the positive pressurization system discussed above.

With reference again to the first exemplary embodiment shown in Figures 1-4, in order to pressurize the facility and maintain its internal pressure, vestibule doors 26 and 28 would have to be closed. In order to exit the enclosure once it is pressurized, one could simply leave the enclosure's interior 20, for example through first access door 27, and thereafter close the access door and remain in the vestibule region 22 while it is depressurized through an appropriate purge valve or the like so that one can then exit to the outside through vestibule door 26 without disturbing the internal pressure. The reverse process could be done to enter the facility which would entail pressurizing the vestibule to the internal pressure of interior 20. Accordingly, although not necessary, it may be desirable to provide sets of vestibule access and enclosure access doors which are electromechanically
coupled to one another so that their locked and unlocked states can be selectively controlled simultaneously as desired.

Other capabilities for controlling meteorological conditions inside the practice facility's enclosure 12 may also be appreciated with reference to Figures 3 and 4. A cooling system 60 is provided which may include a 20 ton air chilled cooler 62 coupled to a cold water pump 64 via piping 66, with cold water pump 64 coupled to a cooling coil in the air handling unit 46 preferably via steel piping 68 which penetrates the enclosure's sidewall 14. A heating system 70 incorporates a hot water boiler 72 coupled through piping 74 to a hot water pump 76, which itself is coupled to a heating coil in the air handling unit 46 via steel piping 78 hot water boiler may be a 300,000 BTUH sea level input, gas fired boiler. A humidification system 80 may also be provided which includes a steam boiler 82 coupled to a humidifier in air handling unit 46 via copper piping 84. Steam boiler 82 may be rated as a 167,000 BTUH sea level input and 5 PSIG steam, gas fired boiler.

It can be appreciated, then, that various meteorological conditions within the enclosure's interior 20 can be adjusted including temperature, humidity and air pressure or air density. Further, an appropriate control system, such as a direct digital control system which is highly reliable and user friendly can be employed in conjunction with various mechanical components discussed above to selectively vary and regulate the internal environment of the enclosure to obtain different sets of meteorological conditions. Conveniently, programmable systems are available which operate in user friendly environments, such as a Windows® environment on a computer terminal, via a handheld device or via a wall mounted control panel. As such, a control system could be configured to allow a user to enter into the enclosure, select a baseball venue or city of choice, thereby establishing an air
pressure at which the enclosure is to be pressurized. The user can additionally conveniently set the temperature and humidity to desired levels, thereby simulating certain environmental conditions to levels akin to those which might be experienced were the player physically at the venue of choice.

In order to enhance the practicing environment for the sports participant(s), a plurality of items correlated to the sporting activity, here baseball, are located within the enclosure’s interior 20 and arranged to simulate an appearance of at least a portion of the playing field, particularly the pitching and batting areas. To this end, as generally appreciated with reference to Figures 1, 2 and 4, a practice area 90 is provided having a pitching station 92 which includes a pitching mound 94 and pitcher’s rubber 96, as well as a batting station 98 which includes a home plate 99. Thus, it can be appreciated that players (such as a pitcher, batter and catcher) can practice their forte for an interval of time while being exposed to a desired set(s) of meteorological conditions. As shown in Figure 2, netting 11 can be appropriately anchored within the enclosure and suspended in such a fashion to reduce the risk of damage to the interior as well as reducing the risk of injury to players. Further, an appropriate screening device, such as a chain link fence 13 can be positioned in front of the air handling unit 46 to prevent damage thereto. A plurality of light fixtures 86 may also be distributed throughout the enclosure’s interior and appropriately mounted at desired locations along it’s cylindrical sidewall 14. In this particular configuration, it is preferred that each of lights, 86 be a 1,000 watt pulse start, metal halide fixtures with an asymmetrical indirect lens and spaced apart 8 ft on center along both sides of the enclosure to maintain 150 foot candles. Of course, as with other aspects of the present invention, this is only one possible type of arrangement which may be employed. Although not shown in the figures, the electrical system for
the facility could also incorporate other surface mount florescent light fixtures for the various rooms of the housing 24, as well as appropriately placed outlets, light switches, etc. throughout. With this particular configuration, 600 amp electrical service with 208 volts/3 phase would be preferably employed.

Having described in some level of detail a preferred construction for the climate controlled practice facility according to a first exemplary embodiment of the present invention, other configurations which are contemplated will now be described. However, since the particular structural, mechanical, electrical and control systems for use with these other exemplary embodiments would be within the purview of the ordinarily skilled artisan(s), particularly in view of the level of detail which has been discussed above in connection with the first exemplary embodiment, they need not be repeated herein. In addition, it should be understood that, as with the first exemplary embodiment of the practice facility of the present invention, any of these additional configurations could be buried wholly or partly underground or entirely above ground, as desired.

With this in mind, a second exemplary embodiment for a climate controlled training facility 100 which is also particularly suited for practicing the sport of baseball is shown in Figures 5-7. Here, practice facility 110 includes a dome-shaped enclosure 112 having a circumferential outer wall 114 which extends between a base 116 and a domed roof 118. As may be seen practice facility 110 is much larger than that discussed above with reference to the first exemplary embodiment so that it may accommodate a plurality of practice areas 120-137 for training numerous ball players. The outer wall 112 of the enclosure’s cylindrical shell has a diameter of approximately 208 ft and a wall height preferably of at least 24 ft. The domed roof 118 may extend therefrom an additional 3 ft. to its peak. A plurality of partition
members 140-157, such as walls or caged fencing, extend radially outward from the enclosure's center toward its outer surrounding perimeter wall 114. These partition member 140-157 are equiangularly distributed about the center and preferably extend between a centrally disposed and upstanding tower 102 and an inner circumferential wall 104, thereby to form a plurality of generally triangularly practice regions 120-137 each having an associated pitching station and batting station as discussed above. Inner circumferential wall 104 may be spaced from outer wall 114 by approximately 8 ft to provide a circuitous walkway 106 around the facility. Access to each of the practice regions may be provided by associated doors 108 so that the practice regions become accessible from walkway 106. Further, associated pairs of windows 109 may be provided so that walkway 106 serves the dual purpose of an observation hallway so that coaches or others may conveniently view the players as they practice.

A second, upper observation hall and walkway 116 (Figure 7) can be provided which is accessible via the stairways 117 (Figure 6). This two-tiered approach for observing the players both enhances the viewing capabilities, but additionally can provide for other capabilities such as filming the players if desired. Centrally disposed tower 102, as shown in Figures 6 and 7, may include a pair of concentric cylindrical walls 160 and 162, also separated by a distance of approximately 8 ft and with upper and lower levels accessible by stairway 164 to provide additional observation posts. Furthermore, the inner circumferential ring 162 may also have two stories, with its upper level 166 perhaps accommodating necessary electrical and mechanical equipment 167 and its lower level 168 perhaps serving as a storage level for various things such as pitching machines and other sport-related items for which storage might be desired.
One or more access points to the facility may be provided including one or more vestibules such as vestibule 150 which, as discussed above, serves a decompression region and includes an associated vestibule access door 152 as well as an enclosure access door 154. If desired also, where practice facility 110 is located proximate to an actual baseball stadium, it could be accessed from the stadium through an above or below ground tunnel which becomes accessible via vestibule door 152.

Necessarily, the outer confinement walls of the enclosure 110 as well as the walls of vestibule 150 would need to be constructed of appropriate material capable of withstanding the pressure differentials which may be present. Other internal walls, such as partition walls 140-157, inner perimeter wall 104 and the circumferential walls 160 and 162 need not be constructed with such considerations in mind since they would not be exposed to pressure differentials. It should also be noted from this second exemplary embodiment that all of the electrical and mechanical equipment including, for example, the necessary pressurization fan(s) are housed entirely within the interior of the enclosure so that their particular location (i.e. inside or outside) might be dictated more by space requirements than anything else. For instance, while the pressurization fan(s) need to draw air at their intake from the outside environment, this does not require that the fan(s) itself be physically located outside the facility, but rather that it’s intake be in communication with the external environment to draw intake air.

It should be understood that this second exemplary embodiment of the climate controlled practice facility 110 of the present invention only presents one possible layout for accommodating many players and many practice areas so that it should not be unduly limited to the particular layout which is described herein. As an
example, it is contemplated that different pressure zones could be conveniently provided within the facility itself, for example, by having one or more appropriately constructed divider walls extending diametrically through the enclosure's interior and constructed appropriately to withstand expected pressure differential ranges. In this way, different regions of the enclosure's interior can be pressurized to different levels so that players can practice at different meteorological conditions accordingly. If constructed large enough, the facility could instead, or perhaps in addition, incorporate a plurality of floor levels which serve different purposes, some of which may have associated practice areas maintained at different pressure ratings. Other amenities for the facility might be the provision of one or more emergency exits separate from and in addition to the vestibule structure(s). Indeed, the entire facility could serve the dual function as a triage center, particularly if it is buried within the ground such that decontamination showers and other emergency-related capabilities could be employed. These represent only a few of the host of possible variations of the dome-shaped facility 110 which are contemplated.

A third exemplary embodiment for a climate controlled baseball practice facility is diagrammatically represented in Figure 8. Here, facility 210 has a generally rectangular footprint having a pair of longitudinally extending perimeter walls 213 and 214 joined by a pair of transversely extending perimeter walls 215 and 216. Arcuate corner wall portion 217 are provided for structural integrity to accommodate the pressure differentials since it would be desirable utilizing angled corners where feasible. Facility 210 is sized to accommodate 20 such practice areas 220-239 as shown and, thus, might have outer wall dimensions of approximately 100 ft x 240ft. A mechanical and equipment room 270 is provided exteriorly of the facility's enclosure 212, as well as a vestibule 280 joined to a tunnel 282 and an emergency
exit ramp 284. As with the second exemplary embodiment of the present invention, facility 210 could have a domed roof (not shown) as well as one or more observation halls extending between outer and inner perimeter walls.

The general footprint for a fourth exemplary embodiment for a climate controlled baseball practice facility 310 is generally diagrammed in Figure 9 to illustrate another rectangular version which is generally square-shaped and somewhat smaller for accommodating a fewer number of practice areas, such as areas 311-315. A fifth exemplary embodiment for a climate controlled practice facility, here one which is particularly suited for training in the sport of basketball under desired meteorological conditions is generally illustrated in the diagrammatic view of Figure 10. Here, facility 410 accommodates a plurality of practice areas 411-416, each having an associated basketball goal 417-422 and resembling the free throw portion of a basketball court. While numerous geometric configurations for practice facilities have been discussed, other configurations which have not been shown could include, for example, those having an oval or elliptical footprint and preferably a domed roof. Although not necessary, it is preferred that any such facility which is constructed have either straight or arcuate contours for those walls which are exposed to pressure differentials in order to enhance the structural integrity thereof.

With the above embodiments in mind, it should also be readily appreciated that the present invention additionally provides for a method for practicing a selected sporting activity.

According to this methodology, a climate controlled enclosure is provided having an interior which is sized and adapted to accommodate a plurality of participants of the sporting activity. A pressure differential preferably in the range
discussed above is created between the interior and an outside environment. Before or after this is done, participants enter into the enclosure's interior and thereafter seal it from the outside environment. Thereafter, the participants practice the sporting activity for an interval of time.

As desired, the pressure, temperature and humidity of the interior can be periodically adjusted to different settings. It is preferred that ingress into the facility be prevented during the interval of time in which the players are practicing. The enclosure's interior, in addition to the practice areas discussed above, may also have a decompression area adapted to be placed in isolation from the practice areas. Once practice is completed, players can exit the practice area and enter into the decompression area which is adapted to be isolated from the enclosure's interior. Thereafter, pressure within the decompression area can be adjusted to a level corresponding to that of the outdoor environment, after which the players exit the decompression area to the outdoor environment.

Accordingly, the present invention has been described with some degree of particularity directed to the exemplary embodiments of the present invention. It should be appreciated, though, that the present invention is defined by the following claims construed in light of the prior art so that modifications or changes may be made to the exemplary embodiments of the present invention without departing from the inventive concepts contained herein.
I claim:

1. A climate controlled practice facility, comprising:
   a. an enclosable building including:
      i. a plurality of walls joined together to substantially surround a
         building interior; and
      ii. a first building access door operative in an open position to
          permit passage between an external environment and the
          building interior and operative in a closed position to enclose the
          building interior and isolate the building interior from the external
          environment;
   b. a pressurization unit in communication with the interior of said
      enclosure and selectively operative upon activation to pressurize the
      interior to achieve a selected pressure differential between said interior
      and the external environment having an absolute value in a range of
      .02 psi to 7 psi, inclusively; and
   c. a plurality of items correlated to a selected sporting activity, said items
      located within the interior of said building and arranged to simulate an
      appearance of at least a portion of a playing environment associated
      with the selected sporting activity.

2. A climate controlled practice facility according to claim 1 including a
   vestibule projecting exteriorly of said building and accessible from the
   building interior through said first building access door, said vestibule
   including a vestibule access door operative in an associated vestibule
   access door open position to permit passage between the external
   environment and said vestibule and operative in an associated vestibule
access door closed position to isolate said vestibule from the external environment.

3. A climate controlled practice facility according to claim 2 wherein said first building access door and said vestibule access door are each adapted to be placed in respective locked and unlocked states.

4. A climate controlled practice facility according to claim 3 wherein said first building access door and said vestibule access door are electromechanically coupled to one another so that their respective locked and unlocked states can be simultaneously controlled.

5. A climate controlled practice facility according to claim 1 wherein at least some of said walls are formed by a plurality of wall panels joined together in a sealed arrangement.

6. A climate controlled practice facility according to claim 4 wherein said walls are constructed of a material composition which is capable of withstanding the selected pressure differential without significant structural deformation.

7. A climate controlled practice facility according to claim 5 wherein said material composition is selected from concrete, steel and aluminum.

8. A climate controlled practice facility according to claim 1 wherein said first building access door is a water impermeable marine door.

9. A climate controlled practice facility according to claim 1 including a second building access door associated with said building, said second access door spaced apart from said first access door and operative in an associated second access door open position to permit passage between an external environment and the interior and in an associated second
access door closed position to isolate the interior from the external environment.

10. A climate controlled practice facility according to claim 1 wherein said pressurization unit is disposed exteriorly of said building, and including a conduit interconnecting said pressurization unit and said building interior thereby to establish fluid communication therebetween.

11. A climate controlled practice facility according to claim 10 including an air handling unit disposed in said building interior in communication with said pressurization unit via said conduit, said air handling unit operative upon receipt of pressurized air from said pressurization unit to circulate the pressurized air throughout the building interior.

12. A climate controlled practice facility according to claim 1 wherein said pressurization unit is located within the building’s interior.

13. A climate controlled practice facility according to claim 1 wherein said building is supported above ground level.

14. A climate controlled practice facility according to claim 1 wherein said building is buried below ground level.

15. A climate controlled practice facility according to claim 1 wherein said pressure differential is between 0.1 psi and 3 psi.

16. A climate controlled practice facility for simulating an environment associated with at least one selected sporting activity so that participants practicing within the practice facility can acclimate themselves to selected playing conditions, said climate controlled practice facility comprising:
a. an enclosure having a selected geometric configuration which is sized and adapted to accommodate a plurality of participants, said enclosure including:
   i. a plurality of enclosure walls joined together in a sealed, air tight arrangement to surround an enclosure interior; and
   ii. an enclosure access door operative in an open position to permit ingress into and egress out of the interior of said enclosure and operative in a closed position to impede ingress into and egress out of the interior of said enclosure;

b. a programmable climate control system operative upon activation to selectively regulate a set of meteorological conditions within the interior; and

c. a plurality of items correlated to the selected sporting activity, said items located within the interior of said enclosure and arranged to simulate an appearance of at least a portion of a playing surface associated with the selected sporting activity so that the participants may enter the enclosure through said enclosure access door and practice the selected sporting activity for an interval of time while being exposed to said set of meteorological conditions.

17. A climate controlled practice facility according to claim 16 wherein said enclosure includes a domed roof.

18. A climate controlled practice facility according to claim 17 wherein said enclosure includes a circular base.

19. A climate controlled practice facility according to claim 18 wherein said circular base has a diameter of at least two hundred (200) feet.
20. A climate controlled practice facility according to claim 17 wherein said enclosure includes an elliptical base.

21. A climate controlled practice facility according to claim 17 wherein said enclosure has a rectangular base and includes opposed pairs of longitudinally and transversely extending sidewalls, adjacent ones of which are joined together by arcuate corner sections each formed at an appropriate radius of curvature.

22. A climate controlled practice facility according to claim 16 wherein said enclosure is cylindrical in configuration.

23. A climate controlled practice facility according to claim 22 wherein said enclosure has a length of at least sixty (60) feet.

24. A climate controlled practice facility according to claim 23 wherein a portion of said enclosed is buried below ground level.

25. A climate controlled practice facility according to claim 16 including a vestibule projecting exteriorly of said enclosure and accessible from the interior through said enclosure access door, said vestibule including a vestibule access door operative in an associated vestibule access door open position to permit passage between the external environment and said vestibule and operative in an associated vestibule access door closed position to isolate said vestibule from the external environment.

26. A climate controlled practice facility according to claim 16 wherein said programmable climate control system is selectively operative to regulate temperature and humidity within the interior, and to achieve a selected pressure differential between the interior and an external environment that has an absolute value within a range of 0.02 psi to 7 psi, inclusively.
27. A climate controlled practice facility according to claim 26 wherein said programmable climate control system includes a cooling system, a heating system, a pressurization system, and a programmable control station selectively operative to adjust the pressure, temperature and humidity within the interior, each to a desired setting level.

28. A climate controlled baseball practice facility for use in acclimating baseball players to selected playing conditions, said climate controlled baseball practice facility comprising:

a. an accessible dome-like enclosure including a base, a surrounding perimeter wall extending upwardly from said base, and a domed roof supported by said perimeter wall thereby to surround an enclosure interior.

b. a climate control system associated with said enclosure for selectively regulating a set of meteorological conditions within the enclosure interior thereby to simulate the selected playing conditions, wherein said set of meteorological conditions includes pressure and at least one of temperature and humidity, and wherein said climate control system is operative to achieve a pressure differential between the enclosure's interior and an external environment that is greater than 0.02 psi; and

c. at least one practice region located within the enclosure interior, said practice region including a pitching station and a batting station spaced apart a selected distance therefrom, said practice region resembling an appearance of a portion of a baseball playing field so that players may enter the enclosure through said access door and practice for a
selected interval of time while being exposed to said set of meteorological conditions.

29. A climate controlled baseball practice facility according to claim 28 wherein said perimeter wall and said base are circumferential.

30. A climate controlled baseball practice facility according to claim 29 including a plurality of practice regions each disposed within the enclosure interior and distributed equiangularly about a center thereof, each of said practice regions including an associated said pitching station and batting station, and each of said practice regions resembling an appearance of a portion of a baseball playing field so that a plurality of associated player pairs may enter the enclosure through said access door and practice within a respective one of said practice regions for a selected interval of time while being exposed to said set of meteorological conditions.

31. A climate controlled baseball practice facility according to claim 30 wherein each said pitching station includes a pitcher's mound and each said batting station includes a batter's box.

32. A climate controlled baseball practice facility according to claim 30 wherein each of said practice regions is generally triangular in configuration.

33. A climate controlled baseball practice facility according to claim 30 including a plurality of partition members each extending radially outward away from said center and separating adjacent ones of said practice regions.

34. A climate controlled baseball practice facility according to claim 33 including an observation tower centrally disposed within the interior of said
dome-like enclosure and projecting upwardly from said base toward said domed roof.

35. A climate controlled baseball practice facility according to claim 34 including an equipment room for containing equipment associated with said climate control system.

36. A climate controlled baseball practice facility according to claim 34 wherein said equipment room is located in said observation tower.

37. A climate controlled baseball practice facility according to claim 34 wherein said observation tower is cylindrical in configuration, and wherein said facility includes an inner circumferential wall spaced radially inwardly from said perimeter wall to provided a circumferential walkway within the interior of said enclosure.

38. A climate controlled baseball practice facility according to claim 37 wherein each of said partition members extends between said observation deck and said inner circumferential wall, and including a plurality of observation windows disposed in said inner circumferential wall to permit viewing of players within each of said practice regions.

39. A climate controlled baseball practice facility according to claim 28 including at least one enclosure access door operative in an open position to permit ingress into and egress out of the enclosure interior and operative in a closed position to prevent ingress into and egress out of the enclosure interior.

40. A climate controlled baseball practice facility according to claim 39 including a vestibule projecting exteriorly of said enclosure and accessible from the interior through said first access door, said vestibule including a
vestibule access door operative in an associated vestibule access door open position to permit passage between the external environment and said vestibule and operative in an associated vestibule access door closed position to prevent passage between said vestibule and the external environment.

41. A climate controlled baseball practice facility according to claim 28 wherein said climate control system is selectively operative to achieve a pressure differential between the enclosure's interior and an external environment that is between 0.02 psi and 7 psi, inclusively.

42. A method of practicing a selected sporting activity, comprising:
   a. providing a climate controlled enclosure having an interior that is sized and adapted to accommodate a plurality of participants of the selected sporting activity;
   b. in any order:
      i. creating a pressure differential between said interior and an outside environment, wherein said pressure differential has an absolute value in a range of 0.02 psi to 7 psi, inclusively; and
      ii. entering into the interior of said enclosure and thereafter sealing said enclosure from the outside environment; and
   c. practicing the selected sporting activity with the interior of the enclosure for an interval of time.

43. The method according to claim 42 wherein the selected sporting activity is baseball.

44. The method according to claim 42 wherein the selected sporting activity is basketball.
45. The method according to claim 42 including an operation of regulating a set of meteorological conditions within the interior of said enclosure, each to a desired setting level.

46. The method according to claim 45 wherein the set of meteorological conditions includes pressure, temperature and humidity.

47. The method according to claim 46 wherein the operation of regulating the set of meteorological conditions is accomplished prior to entering into the interior of said enclosure.

48. The method according to claim 47 including periodically adjusting the set of meteorological conditions to different desired settings.

49. The method according to claim 42 including preventing ingress into the interior of said enclosure during said interval of time.

50. The method according to claim 42 wherein said interior includes a practice area and a decompression area adapted to be placed in isolation from said practice area, and including the operations of exiting the practice area after said interval of time has elapsed and entering said decompression area.

51. The method according to claim 50 including the operations of isolating said decompression area from the interior of said enclosure, adjusting the pressure within said decompression area to a level corresponding to pressure associated with the outdoor environment, and thereafter exiting said decompression area to the outdoor environment.

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