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(54) **BASEBALL PITCH PARAMETER MEASURING DEVICE**

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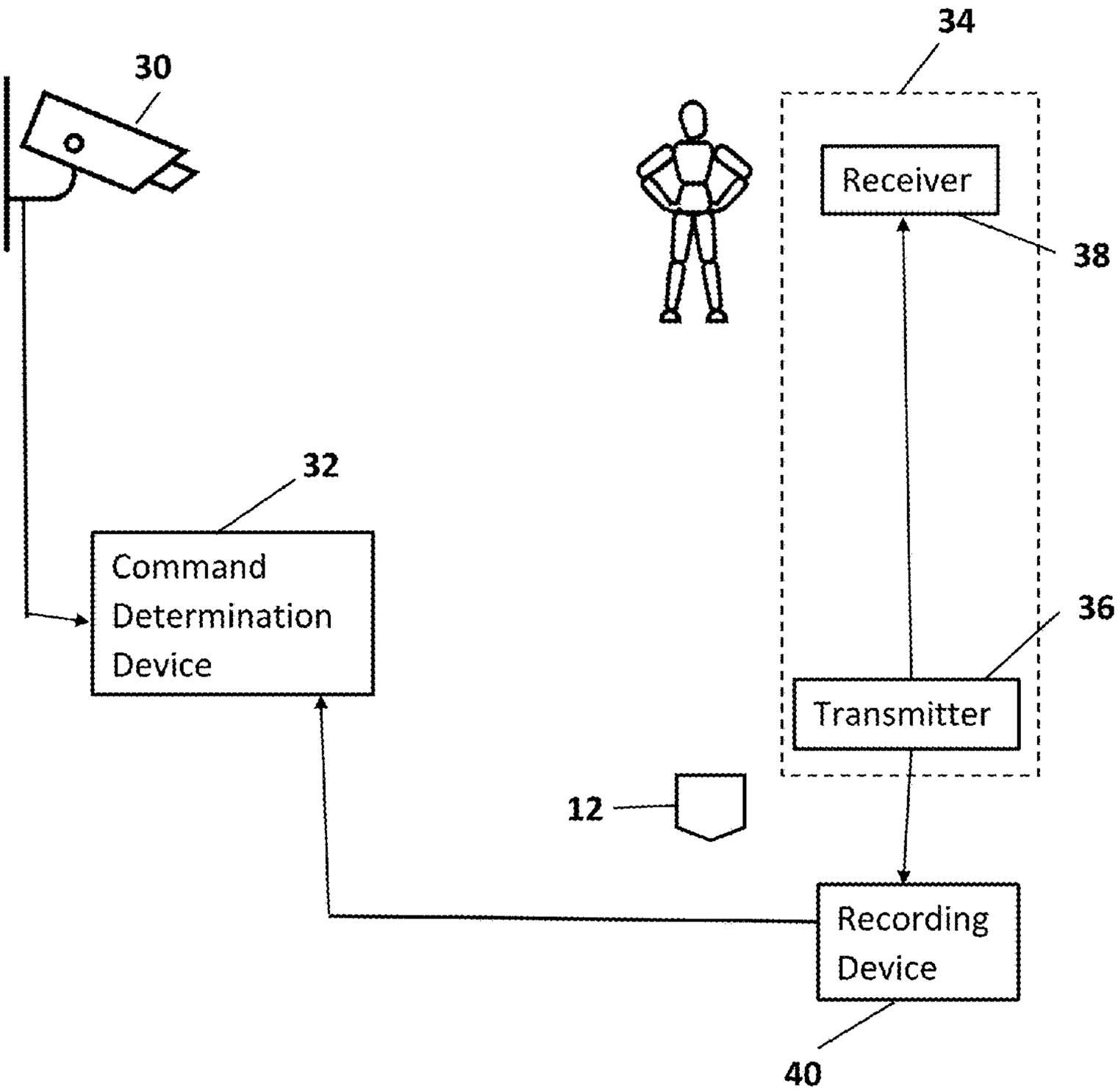
CPC ***A63B 69/0002*** (2013.01); ***A63B 24/0021*** (2013.01); *A63B 2024/0028* (2013.01); *A63B 2069/0006* (2013.01)

(57) **ABSTRACT**

A command measurement system employs a ball flight tracking system that measures the location of a ball as it breaks the plane of the strike zone. The command measurement system also employs an intended pitch location system that provides the pitcher with a wireless signal to inform the pitcher of the intended pitch location. This intended pitch location target forms the pitcher's intent of where he or she is trying to pitch the ball. The measured pitch location is compared to the intended pitch location and a measure of command is determined by the amount of deviation of the measured location from the intended pitch location.



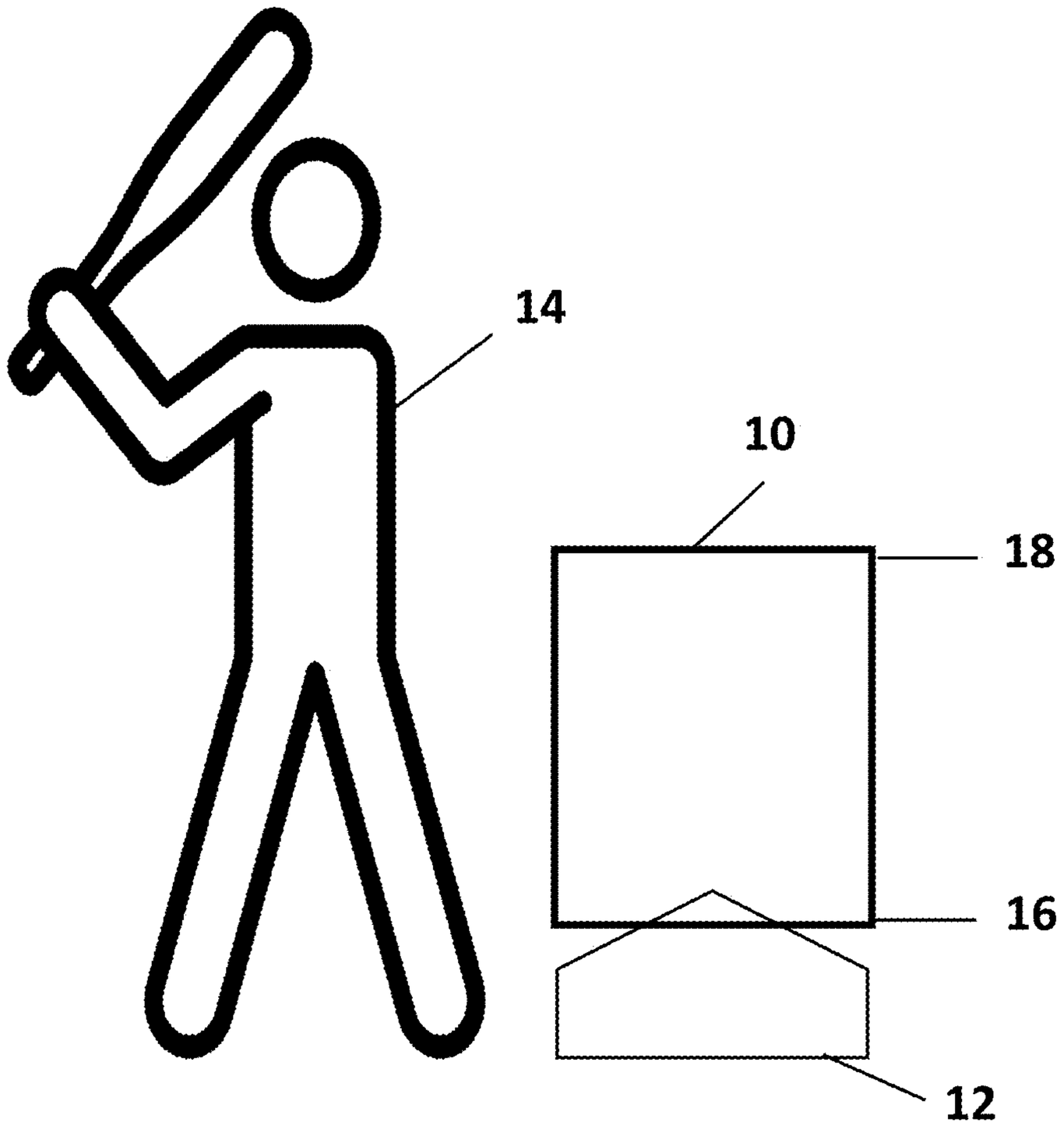


FIG. 1

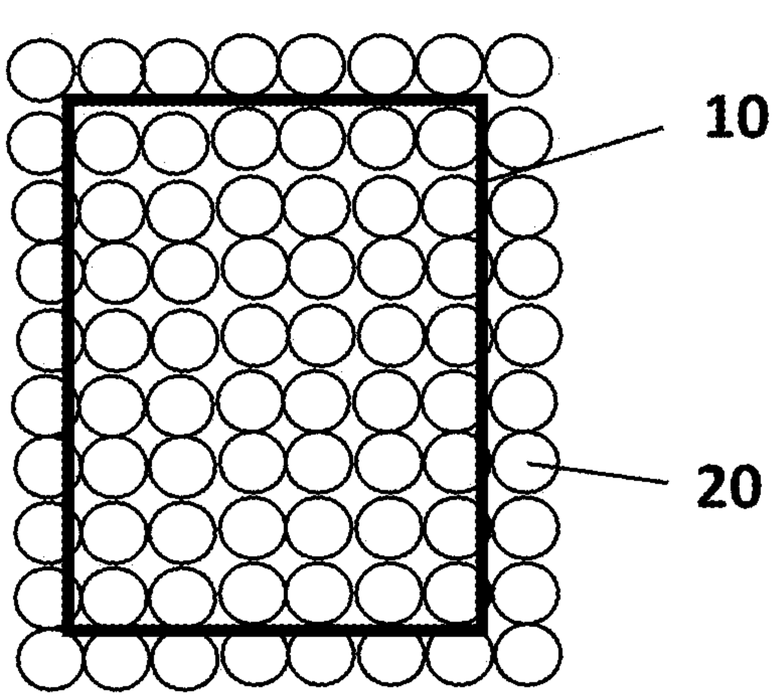


FIG. 2

FIG. 3

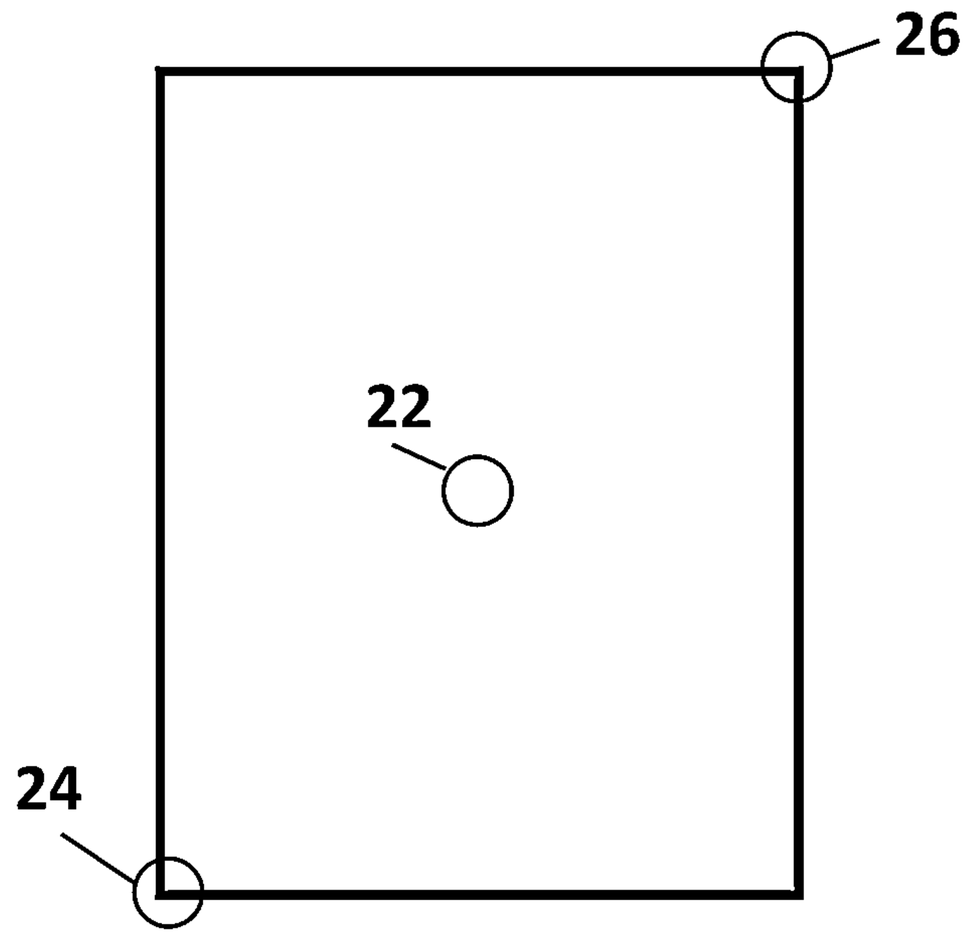


FIG. 4

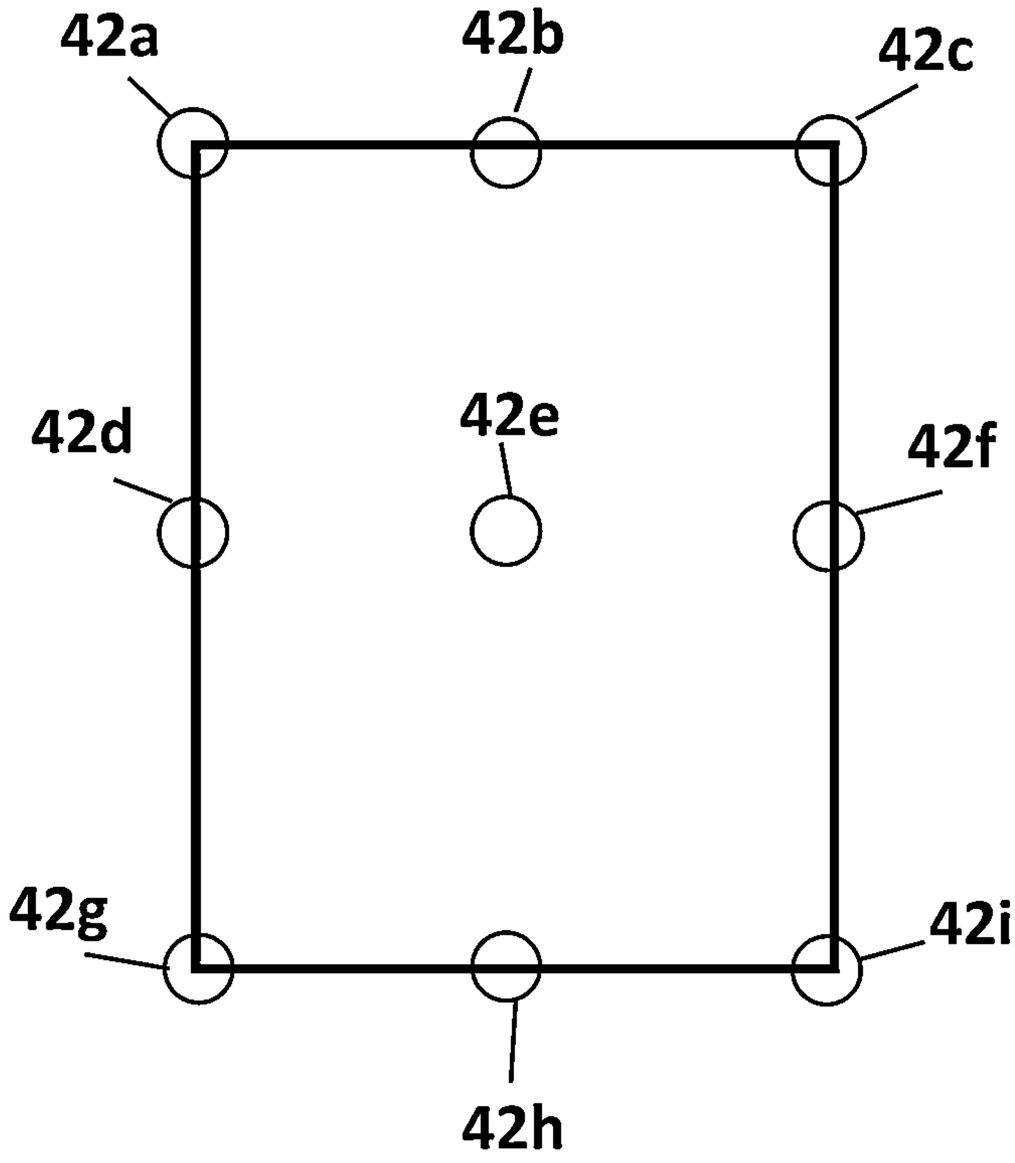


FIG. 5

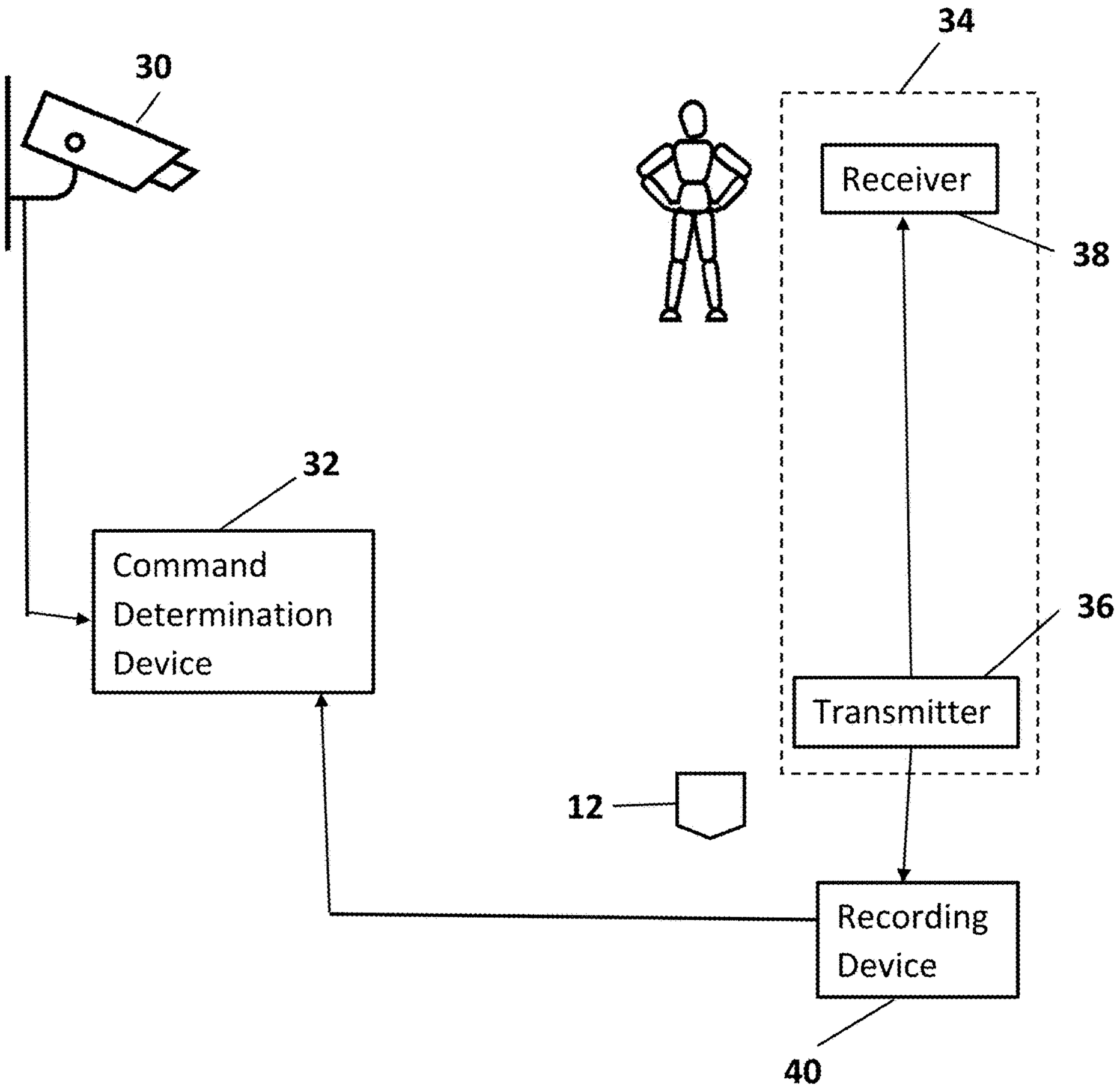

30
32
Command Determination Device
34
Receiver
38
36
Transmitter
12
Recording Device
40

FIG. 6

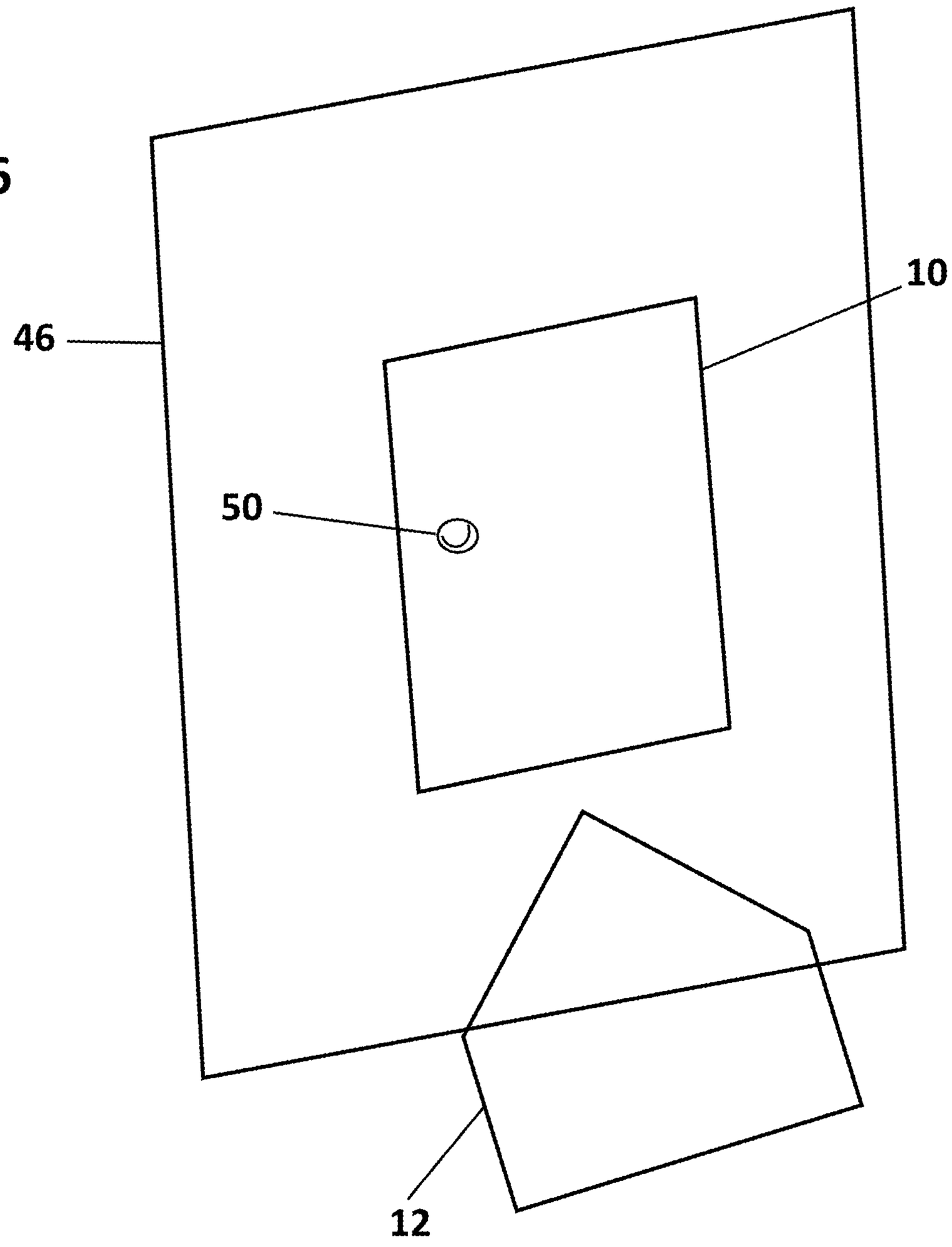


FIG. 7

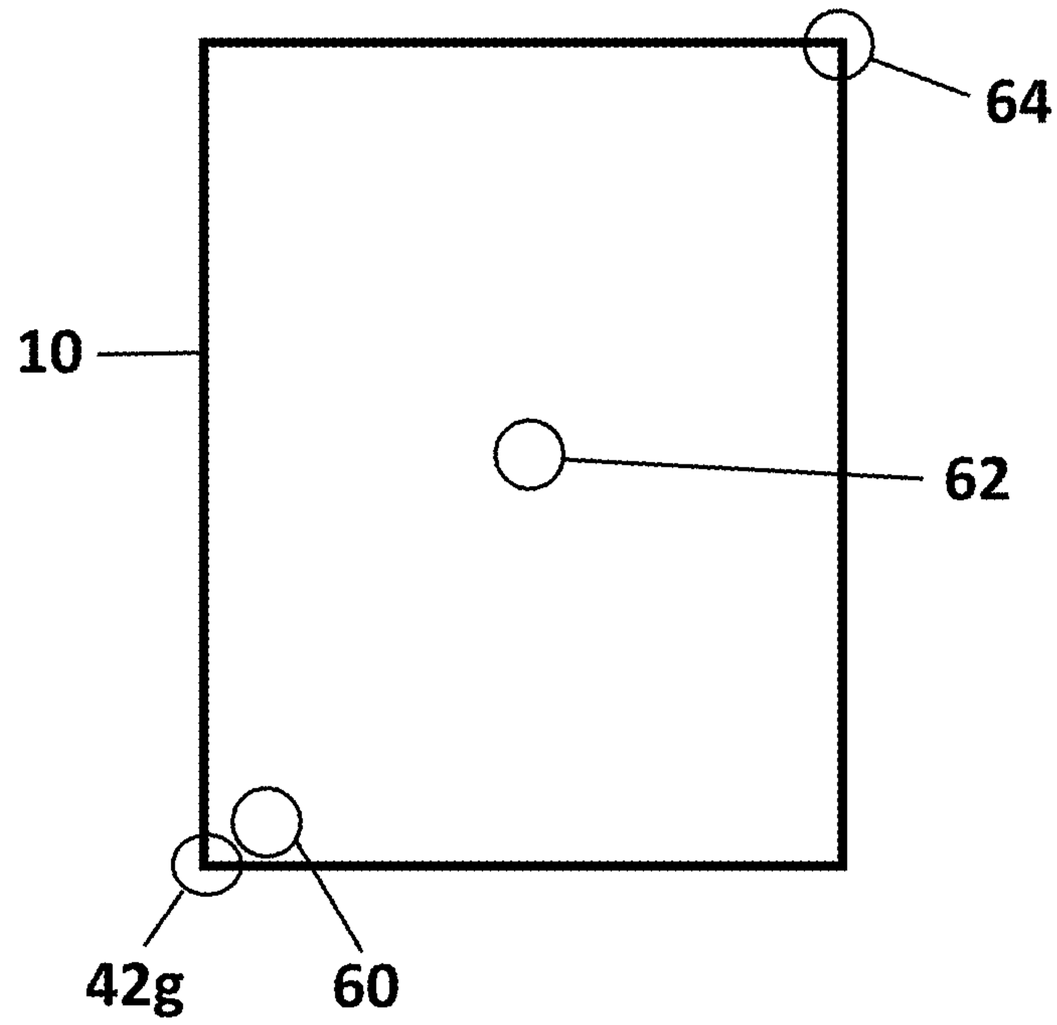


FIG. 8

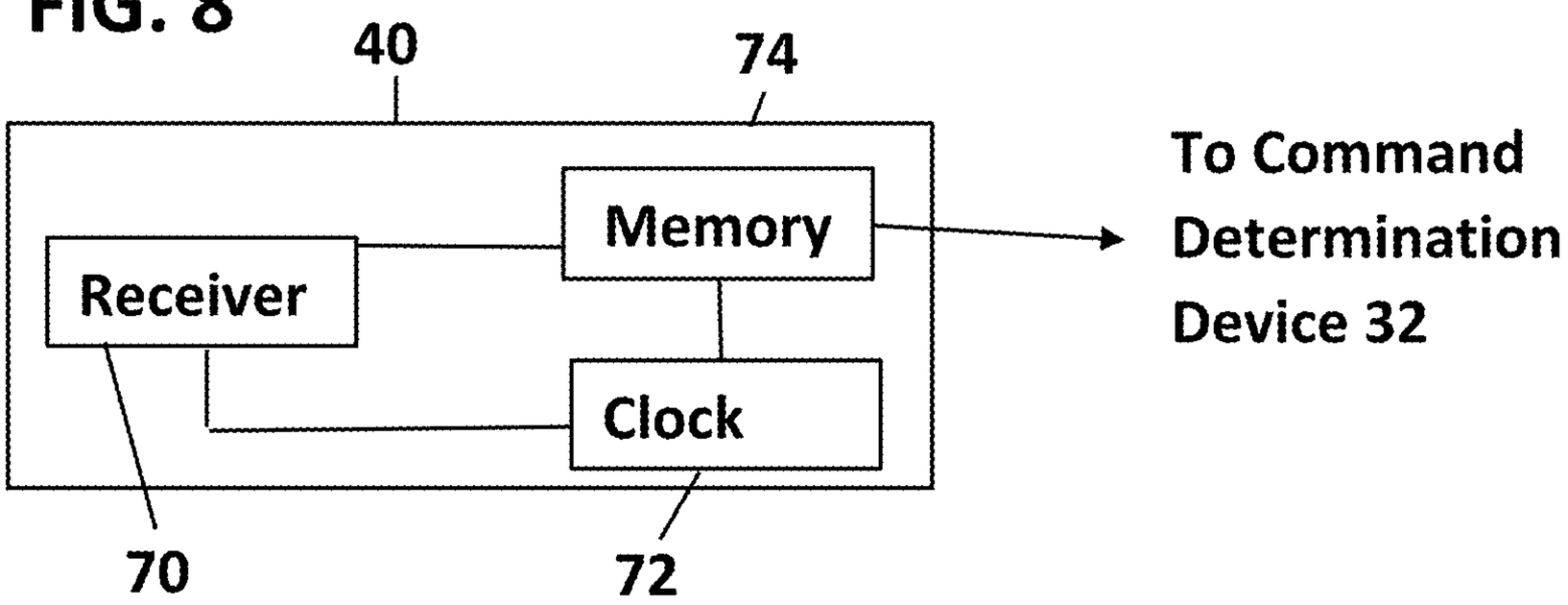


FIG. 9

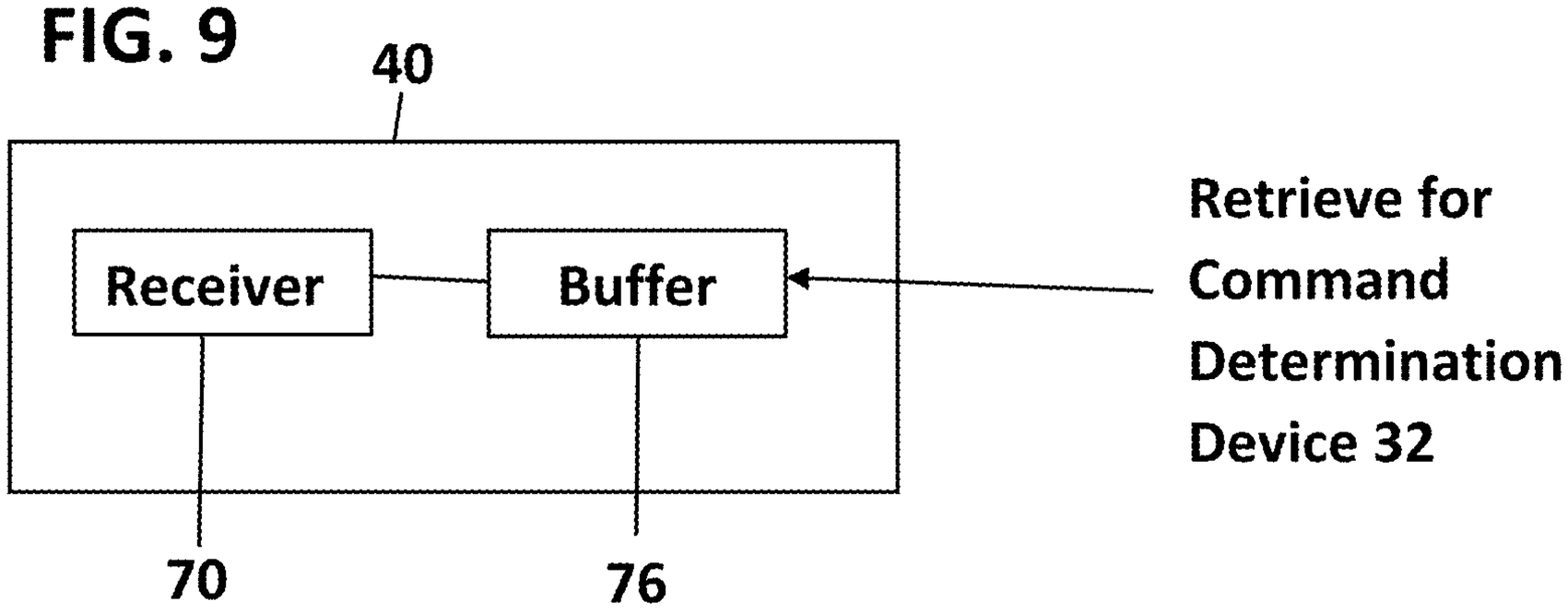


FIG. 10

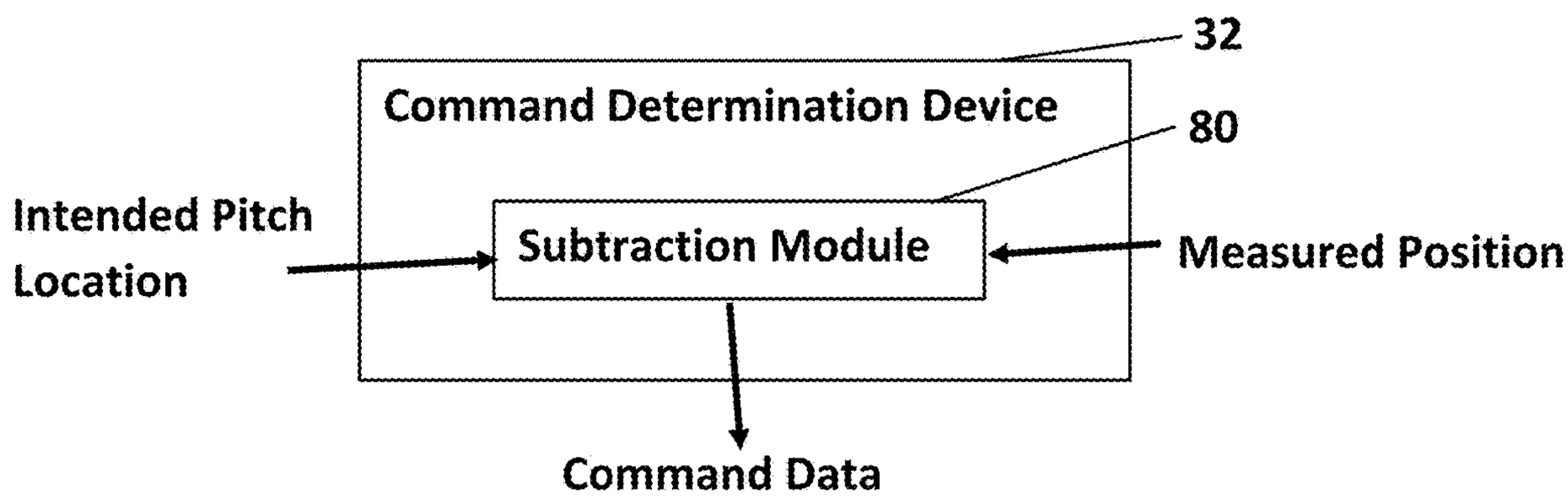


FIG. 11

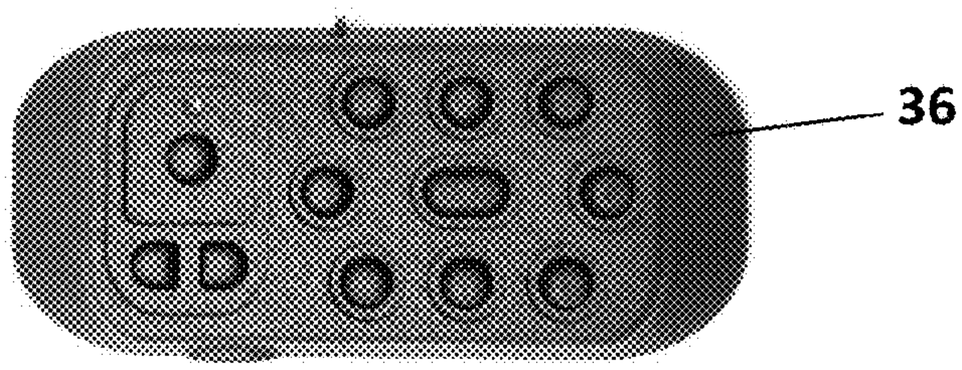


FIG. 12

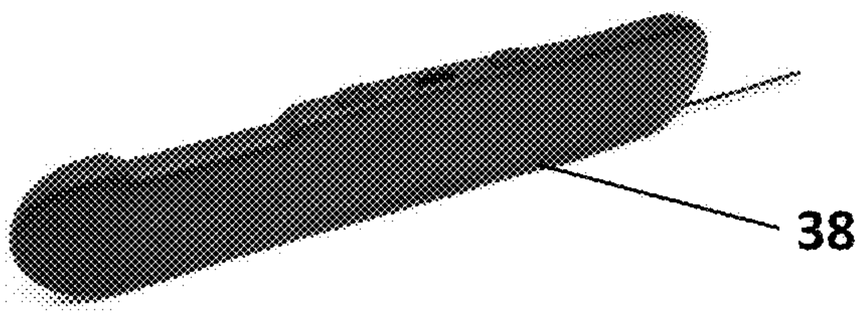
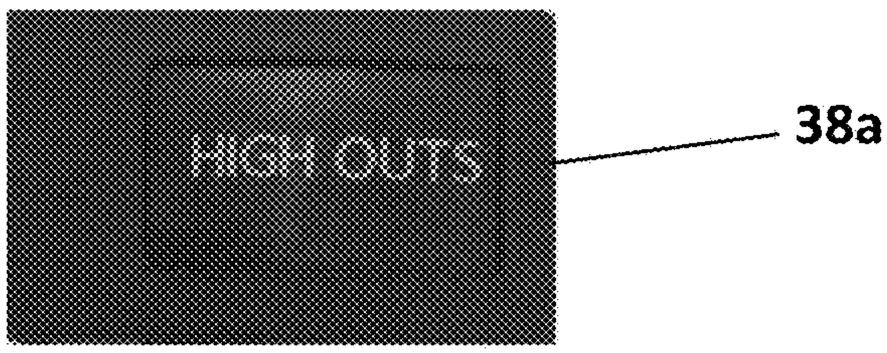


FIG. 13



BASEBALL PITCH PARAMETER MEASURING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 18/430,148, filed Feb. 1, 2024, which claims the benefit of priority to U.S. Provisional Patent Application No. 63/442,655, filed Feb. 1, 2023, the contents of which are incorporated herein by reference in their entirety.

TECHNICAL FIELD

[0002] The present disclosure relates generally to measuring a parameter of a baseball pitch.

BACKGROUND

[0003] Baseball has been a sport steeped in tradition, with change coming slowly. This included changes to the game on the field and also to player evaluation and development. In recent decades, however, there has been an increased willingness, and even desire, to modernize the sport in many ways. Major League Baseball ("MLB") has been altering the rules recently to allow electronic communication between the catcher and the pitcher, banned shifting of players, added a pitch clock, increased the size of the bases and even changed the alignment of the layout of the bases. These changes have and will alter the way the game has been played for over a hundred years.

[0004] Player evaluation and development has also seen a revolution with the advent and application of technology to the sport. For many years, coaches and scouts relied on their eyes to coach and evaluate players. For pitchers, for example, until the introduction of the radar gun, it was very difficult to precisely determine how fast a pitcher was actually throwing. Since the introduction of the radar gun, a number of technological innovations have been introduced that help coaches and scouts in their coaching and evaluation. These include sophisticated tracking devices that can track players, bats, baseballs and more, with increasing precision. However, current approaches to measuring baseball pitch parameters area are error prone. Hence, there is a need for improved systems and methods for measuring baseball pitch parameters.

SUMMARY

[0005] The present application provides a technical solution to the technical problem of providing precise measurements of the command of a pitcher. These needs are met by pitch evaluation system having an intended pitch location system that includes a transmitter configured to wirelessly send a selectable intended pitch location, and a pitcher receiver configured to receive the intended pitch location and signal the pitcher with the intended pitch location. The system further has a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane. A recording device is in communication with the intended location system to receive and store the intended pitch location. A command determination device is coupled to the recording device and receives and compares the intended pitch location with the measured position. The command determination device outputs a command parameter that indicates a measure of difference between the intended pitch location and the measured position.

[0006] An example pitch evaluation system according to the disclosure includes a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane and output a measured position of the thrown baseball; a recording device in communication with an intended pitch location system to receive and store an intended pitch location transmitted by the intended pitch location system; and a command determination device coupled to the recording device and the measuring device configured to receive and compare the intended pitch location with the measured position and output a command parameter indicating a measure of difference between the intended pitch location and the measured position, and the command determination device storing the command parameter in a memory associated with the pitch evaluation system.

[0007] Another example pitch evaluation system according to the disclosure includes a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane and output a measured position of the thrown baseball; a recording device in communication with an intended pitch location system to receive and store an intended pitch location transmitted by the intended pitch location system; and a command determination device coupled to the recording device and the measuring device configured to receive and compare the intended pitch location with the measured position and output a command parameter indicating a measure of difference between the intended pitch location and the measured position.

[0008] An example method of measuring the command of a pitcher using a pitch evaluation system according to the disclosure includes recording an intended pitch location in relation to a strike zone using a recording device in communication with an intended pitch location system to receive and store an intended pitch location transmitted by the intended pitch location system; measuring a position of a thrown pitch using a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane and output a measured position of the thrown baseball; comparing the measured position to the intended pitch location using a command determination device to determine the distance between the measured position and the intended pitch location to form a measure of command of the pitcher; and storing the measure of command of the pitcher in a memory associated with the pitch evaluation system.

[0009] It is understood that other configurations of the subject technology will become readily apparent to those skilled in the art from the following detailed description, wherein various configurations of the subject technology are shown and described by way of illustration. As will be realized, the subject technology is capable of other and different configurations and its several details are capable of modification in various other respects, all without departing from the scope of the subject technology. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The drawing figures depict one or more implementations in accord with the present teachings, by way of example only, not by way of limitation. In the figures, like reference numerals refer to the same or similar elements. Furthermore, it should be understood that the drawings are not necessarily to scale.

[0011] FIG. **1** is a perspective view of a batter standing at home plate with the outlines of a strike zone.

[0012] FIG. **2** is a pictorial representation of the area of the strike zone measured in baseball diameters.

[0013] FIG. **3** is a front view of a strike zone with balls superimposed to explain the distinction between control and command.

[0014] FIG. **4** is a depiction of a strike zone with exemplary intended pitch locations.

[0015] FIG. **5** is a schematic depiction of a measurement system that measures command data constructed in accordance with embodiments of the present disclosure.

[0016] FIG. **6** is a perspective view of a strike zone and a ball crossing a plane containing the strike zone.

[0017] FIG. **7** is a front view of a strike zone depicting an exemplary intended pitch location and three exemplary measured pitch locations.

[0018] FIG. **8** is a block diagram depicting a recording device that records and stores intended pitch locations in accordance with certain embodiments of the present disclosure.

[0019] FIG. **9** is a block diagram depicting a recording device that records and stores intended pitch locations in accordance with certain other embodiments of the present disclosure.

[0020] FIG. **10** is a block diagram of a command determination device that outputs a command parameter that indicates a measure of difference between the intended pitch location and the measured position.

[0021] FIG. **11** is a perspective depiction of an example transmitter usable with embodiments of the present disclosure.

[0022] FIG. **12** is a perspective view of an example audio receiver worn by a pitcher in accordance with embodiments of the present disclosure.

[0023] FIG. **13** is a perspective view of an example display receiver constructed in accordance with embodiments of the present disclosure.

DETAILED DESCRIPTION

[0024] The detailed description set forth below is intended as a description of various configurations of the subject technology and is not intended to represent the only configurations in which the subject technology may be practiced. The appended drawings are incorporated herein and constitute a part of the detailed description. The detailed description includes specific details for the purpose of providing a thorough understanding of the subject technology. However, it will be clear and apparent to those skilled in the art that the subject technology is not limited to the specific details set forth herein and may be practiced using one or more embodiments. In one or more instances, well-known structures and components are shown in block diagram form in order to avoid obscuring the concepts of the subject technology.

[0025] The detailed description set forth below is intended as a description of various configurations of the subject technology and is not intended to represent the only configurations in which the subject technology may be practiced. The appended drawings are incorporated herein and constitute a part of the detailed description. The detailed description includes specific details for the purpose of providing a thorough understanding of the subject technology. However, it will be clear and apparent to those skilled in the art that the subject technology is not limited to the specific details set forth herein and may be practiced using one or more embodiments. In one or more instances, well-known structures and components are shown in block diagram form in order to avoid obscuring the concepts of the subject technology.

[0026] Using tracking devices, it is possible to precisely measure many different parameters of a pitch. Knowing these measurements, baseball coaches, scouts and executives can make a determination on which pitchers to acquire or trade. They can also use these measurements to help a pitcher improve. These measurements can also serve a role in preventing a pitcher injury, for example, by spotting when a pitcher's release point has changed. Preventing pitcher injuries is extremely important given the investment that teams make in pitchers, not to mention the importance to the player himself. Some of the parameters include velocity, spin rate, vertical break, horizontal break, and release point.

[0027] Certain tracking devices can also determine precisely where the baseball crosses the plate. MLB has explored using an Automated Ball Strike ("ABS") system that would automate the process of calling balls and strikes, removing the umpire from this task. As of 2023, the ABS is being tested at all of the AAA stadiums.

[0028] "Control" has been considered for decades to be a critical measure of the skill of a pitcher. This is a measure of whether a pitcher can controllably throw a pitch within the strike zone. In the past, before tracking, one would simply compare the number of strikes called to balls called to form a measure of the pitcher's control. Using a tracking device, at least the measurement of which balls were in the strike zone can be more precise and not rely on the consistency of an umpire's skill at calling balls and strikes. At this juncture, using tracking devices, it is possible to precisely measure the control of a pitcher.

[0029] While it is important to have good control as a pitcher, it is even more important to have good "command". Front office executive, scouts, coaches, and players, along with sophisticated fans, recognize the difference between command and control. The strike zone is defined as an area that is 17 inches wide (the width of home plate) and a height that is between a batter's knees and the midpoint of the torso. For an average sized major league player, the height of the strike zone can be 24 inches. A baseball is a little less than three inches in diameter. If a ball even touches the outside edge of the strike zone it is called a strike. These dimensions mean that for practical purposes, a strike can be called in a zone that is 8 balls wide by 10 balls high, or 80 square baseballs. Measuring whether a pitcher can throw a baseball within an area that is the size of 80 baseballs will show a pitcher's control, but not his command, which is a much more precise parameter.

[0030] It is well-known that simply throwing pitches with control is not enough to be a dominant pitcher. For example, throwing a pitch straight into the center of the strike zone

shows control. Unfortunately for the pitcher and his team, a fastball straight into the center of the strike zone will often be hit a long way. It is much more important for a pitcher to throw to the edges of the strike zone as this makes it more difficult for batters to hit the ball. They will either have to extend the bat (for a pitch on the outer edge of the zone) or the ball will be too close to their hands to make solid contact on the meat of the bat (for a pitch on the inner edge of the zone). A pitcher who is said to have good command "hits his spots". This means that the pitcher is throwing the baseball precisely where he intended to throw it. Instead of the ball entering the strike zone anywhere within that 80 baseball-sized area, a pitcher with excellent command will have his pitch enter the strike zone within a ball or two in the strike zone of where he was aiming. Command is therefore distinguished from control in that it involves the pitcher's intent. It is a measure of where a pitcher intends to throw compared to where the ball crosses the plane of the strike zone.

[0031] Despite all the sophistication of modern pitch tracking devices, it has been impossible to measure a pitcher's intent to form a measure of command. The difference between a pitcher with good command and one that has good control, but not good command is enormous. The pitcher with good command, who is able to throw strikes without throwing pitches in the strike zone that are easier to hit, is much more valuable to teams. Front office executives, scouts, coaches, and players all could use command data, if it were available. The player evaluators could use command data to make multi-million-dollar decisions on which free agent pitchers to acquire, which players to promote from the minor leagues, and which players that could use help in this area. The coaches and players could use command data to give them critical feedback to adjust their grip, pitching motion, arm slot, etc. that will improve their command.

[0032] During a game, it has been impossible to record where a pitcher intended to throw a pitch, partly because providing an indication of where he is going to throw a pitch will give the batter a sizable advantage in trying to hit the ball. A pitcher will often throw more than 100 pitches in a single game. It is too much to ask a pitcher after the game to reconstruct where he intended to throw each of those pitches.

[0033] Techniques for tagging pitches are provided herein that provide a technical solution to the technical problems associated with providing precise measurements of the command of a pitcher discussed above. Techniques for measuring and providing command data related to thrown pitches are provided. These techniques can be applied to pitches thrown in bullpens, in practice and during games. The command data can be presented live or at a later time.

[0034] The techniques of the present disclosure convey intended pitch location information to a command determination device. A measuring device uses sensors to measure precisely where the pitch crosses the plane of the strike zone. The command determination device compares the intended pitch location with the precise measurement of where the pitch crossed the plane of the strike zone. The command determination device outputs a measure of the command based on this comparison.

[0035] In certain embodiments of the disclosure an intended pitch location is provided wirelessly to the pitcher, and also to a recorder or directly to a command determination device. The wireless signaling of the pitch location allows the command data to be obtained during actual game play. It would be impracticable or impossible to remember intended pitch locations to compare with actual delivered pitch locations after a game. Providing the pitch locations to the pitcher must also be done covertly so as not to tip the location and give the batter an advantage.

[0036] In certain embodiments of the invention, a pitch evaluation system having an intended pitch location system includes a transmitter configured to wirelessly send a selectable intended pitch location, and a pitcher receiver configured to receive the intended pitch location and signal the pitcher with the intended pitch location. The system further has a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane. A recording device is in communication with the intended location system to receive and store the intended pitch location. A command determination device is coupled to the recording device and receives and compares the intended pitch location with the measured position. The command determination device outputs a command parameter that indicates a measure of difference between the intended pitch location and the measured position.

[0037] FIG. **1** illustrates a pitcher's view of a batter **14** at bat. The width of the strike zone **10** is defined as being the width of home plate **12**. The height of the strike zone **10** varies with the height of the batter **14**. The bottom **16** of the strike zone **10** is set at the knees of the batter **14** at the plate **12**. The top **18** of the strike zone **10** is set at the mid-torso of the batter **14**.

[0038] A baseball is between 2.86 and 2.94 inches in diameter, or just under 3 inches. When the strike zone **10** is about two feet in height, this means that the strike zone **10** is approximately 17 inches by 24 inches. Because a strike should be called whenever a ball touches the outer edge of the strike zone **10**, the width of the strike zone **10** effectively is another 6 inches as is the height of the strike zone **10**. With the baseball being slightly less than 3 inches, this means that the size of the strike zone **10** is about 80 baseballs in area. A graphical representation of this is shown in FIG. **2**. The purpose of showing this graphic is to emphasize that there is a relatively large area for a ball to hit the strike zone **10** and be called a strike. Each of the circles **20** in FIG. **2** is representative of a baseball hitting the strike zone.

[0039] For understanding the importance of command as distinct from control, reference is now made to FIG. **3**. A pitcher can throw a pitch that hits any of locations **22**, **24**, and **26** and they should all be called strikes. If the pitcher throws 3 out of 3 pitches in the strike zone **10**, that can be considered to be good control. However, a pitcher is not likely to intend to throw the ball to location **22**, which is in the center of the strike zone **10**. Pitchers try to avoid the center of the strike zone **10** as it is considered the best location for making good contact with the bat against the ball. By contrast, it is generally considered much more difficult to hit a ball that enters the strike zone **10** at location **24** or **26**. Even though all three locations **22**, **24** and **26** would be considered strikes and show good control, throwing a ball to location **22** when either location **24** or location **26** was the intended target demonstrates a lack of command by the pitcher. To determine command, the intended pitch location needs to be known. Until recently, there has been no practical manner to determine the intended pitch location, especially during a game.

[0040] FIG. **5** shows a pitch evaluation system in accordance with embodiments of the present disclosure. The pitch evaluation system includes a measuring device **30**. The measuring device **30** can be a known measuring device such as, but not limited to, a Yakkertech system, a Trackman system, or a Hawkeye system. These systems use optics or radar to measure different parameters of a thrown baseball. For example, Yakkertech can measure pitch velocity and movement, release point, spin rate, observed spin axis and spin efficiency, among other parameters. Each of these systems, in addition to the other measured parameters, will (with varying degrees of accuracy), measure the horizontal and vertical location of the pitch within the plane of the strike zone **10** as it crosses that plane.

[0041] The signals from the sensor or sensors **30** are provided to a command determination device **32**, such as a computer. The sensor or sensor **30** can comprise one or more radar and/or optical sensors. Based on the signals from the sensor **30**, the command determination device **32** computes and outputs the known pitch parameters in a known manner.

[0042] The pitch evaluation system of the present disclosure includes an intended pitch location system **34** that includes a transmitter **36** and a pitcher receiver **38**. The use of a pitch location system to covertly provide signals to a pitcher and other defenders gained momentum and became legal in Major League Baseball (MLB) and in the NCAA after the sign stealing scandal committed by the Houston Astros came to light in November 2020. Such pitch location systems include a transmitter that transmits a wireless signal to a receiver worn by the pitcher that indicates the pitch and location to the pitcher. Some known intended pitch location systems include those made by PitchCom, Armilla Tech and Game Day Signals. Of these, the system gaining the most notoriety is PitchCom, adopted by MLB in 2022. The PitchCom system allows catchers to call pitches and intended locations using a transmitter like that shown in FIG. **11**. A pitcher will hear the pitch and location using an audio receiver like that shown in FIG. **12** or see the pitch and location using a display receiver like that shown in FIG. **13**. In response to the received pitch and location, the pitcher will attempt to throw that pitch (e.g., fastball or curveball) to the intended location.

[0043] A recording device **40** receives the intended pitch location from the transmitter **36**. This intended pitch location is recorded by the recording device **40**. The command determination device **32** is in communication with the recording device **40** and receives the recorded intended pitch location. As will be explained, the command determination device **32** compares the intended pitch location with the measured location of the pitch when it entered the plane of the strike zone to create the measurement of the command.

[0044] FIG. **4** depicts a front view of the strike zone **10** with specific intended locations. In this embodiment, there are 9 different locations **42***a-i*. The transmitter **36** will transmit a signal corresponding to one of these locations **42***a-i* to the pitcher receiver **38** and to the recording device **40**. The number and position of the intended pitch locations shown in FIG. **4** are exemplary only. More or less locations can be used to provide greater or lesser intended precision. For example, it is possible to use 25 different locations instead of 9 locations.

[0045] FIG. **6** shows the plane **46** of the strike zone **10**. The measuring device **30** will sense when a baseball **50** breaks the plane **46**. The exact location of the baseball within the plane **46**, whether within or without the strike zone **10**, is determined. For example, the x and y position within the plane **46** and relative position from the edges of the strike zone **10** are computed to determine the exact location of the baseball **50**.

[0046] The measurement of command can now be shown graphically with the aid of FIGS. **6** and **7**. Again, the view of the strike zone **10** in FIG. **7** is that from the perspective of the pitcher. Assume that the transmitter **36** has transmitted an intended pitch location "low left" corresponding to location **42***g* in FIG. **6**. This intended pitch location is received by both the pitcher receiver **38** and the recording device **40** as described earlier. The pitcher then throws the pitch, trying to throw the pitch to the low left corner **42***g* as shown in FIG. **7**.

[0047] Three different exemplary results are shown in FIG. **7** to show a comparison of command. These can be three different pitches, for example, all aimed at intended pitch location **42***g*. In a first example, a pitch is measured by the measuring device as entering the plane **46** of the zone at location **60**. This measured location is 17 inches horizontally and 24 inches vertically away from intended pitch location **42***g*. The Pythagorean theorem can be used to calculate the distance from the intended pitch location **42***g* as 29.4 inches. This means that although this pitch **60** was a strike, the pitcher missed his spot by 29.4 inches, which is a measure of command that is not very good.

[0048] Another example is measured pitch location **62**, which is in the center of the strike zone **10**. That means the pitch is 8.5 inches horizontally and 12 inches vertically away from the intended pitch location **42***g*. The distance from the intended pitch location is 14.7 inches. This distance can be considered the measured command data. Although this shows better command than the pitch at location **62**, a command data measurement of 14.7 inches is not considered very good.

[0049] The last example is measured pitch location **64**. This measured pitch location is 4 inches horizontally and 2 inches vertically from the intended pitch location **42***g*. The distance from the intended pitch location is 4.5 inches. This distance can be considered the measured command data. This is a little bit more than the width of one ball and shows much better command than the pitches delivered to pitch locations **60** and **62**.

[0050] FIG. **8** depicts one embodiment of the recording device **40** in accordance with certain embodiments of the present disclosure. The recording device **40** includes a receiver **70** that wirelessly receives the intended pitch location. A clock **72** is connected to a memory **74**. Each indicated pitch location is stored in the memory **74**. The time each indicated pitch location is received by the recording device **70** is associated and stored with the indicated pitch location in the memory **74**. Each entry in the memory includes the indicated pitch location and the time that the indicated pitch location was received.

[0051] FIG. **9** depicts the recording device **40** in accordance with other embodiments of the present disclosure. This embodiment of the recording device **40** includes the receiver **70** that wirelessly receives the intended pitch location. A buffer **76** receives each indicated pitch location. The command determination device **32** retrieves the last received indicated pitch location in the buffer **76** when the measuring device **30** measures a pitch location. The buffering of indicated pitch locations in the buffer **76** accounts for

multiple indicated pitch locations being transmitted prior to the pitcher agreeing on which pitch or location to throw. In games, pitchers will often "shake off" a pitch that a catcher signals for. The command determination device **32** needs to know which of the multiple indicated pitch locations was the one agreed upon between pitcher and catcher. This will be the last indicated pitch location received in the buffer **76** prior to the measuring device measuring a pitch location.

[0052] FIG. **10** is a block diagram of a portion of the command determination device **32**. As stated before, the command determination device **32** can be considered a computer or other computational device. The command determination device **32** will determine the conventional pitch parameters, such as velocity and spin data, based on the measured data signals received from the sensor **30**. The command determination device also includes a subtraction module or circuit **80**. This subtraction module **80** can be part of, or an application run by, a processor. The subtraction module **80** takes as input the measured pitch location from the sensor **32** and the indicated pitch location from the recording device **40** and subtracts one from the other to determine the distance between the indicated pitch location and the measured pitch location. This difference is the command data, which can be stored locally or output to a display or stored remotely. The command data can be shown immediately after the pitch with most systems on the display and can be output or stored in a storage medium. The data storage medium is a non-volatile memory that can be implemented as internal storage of the command determination device **32** or as an external storage that is accessible to the command determination device **32** via a wired or wireless connection. In yet other implementations, the data storage is implemented as a removable memory, such as but not limited to a memory card or removable memory.

[0053] It should be understood that although the terms "ball" and "baseball" have been used interchangeably throughout the description, it should be apparent that the present disclosure is applicable to other thrown objects such as softballs.

[0054] FIG. **11** is a perspective view of an embodiment of a transmitter **36** that can be used with embodiments of the present disclosure. In some embodiments, the transmitter **36** is a push button transmitter that includes one or more buttons, which when pressed, cause the transmitter **36** to transmit an indication of an intended pitch type. It can be, for example, a transmitter that is used in the well-known PitchCom System. That transmitter **36** has 9 buttons that can transmit the pitch and the indicated pitch location. An embodiment of a wireless audio receiver **38** is depicted in FIG. **12**, and can be, for example, an audio receiver that is used in the PitchCom System. The audio receiver **38** receives coded signals from the transmitter **36** and plays audio tracks corresponding to the received coded signals. Another example of a receiver **38** is a display receiver **38***a*, also available with the PitchCom System. The display receiver **38***a* will display the pitch and indicated pitch location instead of audibly playing these signals. Although the transmitter **36** and the receivers **38**, **38***a* form a working embodiment of the intended pitch location system **34** of the present disclosure, the present invention is not limited to the use of these exemplary devices. Other systems for providing intended pitch locations to the recording device **40** and the command determination device **32** may be used instead, as discussed earlier. Further, the recording device **40** has been shown as a separate device for purposes of explanation. The recording device **40** may be a separate device or may be integrated into the command determination device in embodiments of the present disclosure.

[0055] The communication system described in the present disclosure thus provides secure and covert communication of instructions to an athlete, without using visual signaling that can be intercepted through video, binoculars and other methods and then decoded. Embodiments provide for either transmitting only transmit short, coded signals (such as a number) to select stored audio tracks, or a digitized vocal signal. The headset receivers already have the audio tracks stored within. This allows players, who cannot vocalize instructions, to use the system to send instructions to other players on the field. At the same time, however, coaches or other off-field personnel, for example, can provide vocal instructions to players on the field.

[0056] The word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any embodiment described herein as "exemplary" or as an "example" is not necessarily to be construed as preferred or advantageous over other embodiments. Furthermore, to the extent that the term "include," "have," or the like is used in the description or the claims, such term is intended to be inclusive in a manner similar to the term "comprise" as "comprise" is interpreted when employed as a transitional word in a claim.

[0057] All structural and functional equivalents to the elements of the various aspects described throughout this disclosure that are known or later come to be known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the claims. Moreover, nothing disclosed herein is intended to be dedicated to the public regardless of whether such disclosure us explicitly recited in the claims. No claim element is to be construed under the provisions of 35 U.S.C. § 112, sixth paragraph, unless the element is expressly recited using the phrase "means for" or, in the case of a method claim, the element is recited using the phrase "step for".

[0058] The previous description is provided to enable any person skilled in the art to practice the various aspects described herein. Various modifications to these aspects will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other aspects. Thus, the claims are not intended to be limited to the aspects shown herein but are accorded the full scope consistent with the language of the claims, wherein reference to an element in the singular is not intended to mean "one and only one: unless specifically so stated, but rather "one or more." Unless specifically stated otherwise, the term "some" refers to one or more. Pronouns in the masculine (e.g., his) include the feminine and neuter gender (e.g., her and its) and vice versa. Headings and subheadings, if any are used for convenience only and do not limit the subject disclosure.

[0059] While various embodiments have been described, the description is intended to be exemplary, rather than limiting, and it is understood that many more embodiments and implementations are possible that are within the scope of the embodiments. Although many possible combinations of features are shown in the accompanying figures and discussed in this detailed description, many other combinations of the disclosed features are possible. Any feature of any embodiment may be used in combination with or substituted for any other feature or element in any other

embodiment unless specifically restricted. Therefore, it will be understood that any of the features shown and/or discussed in the present disclosure may be implemented together in any suitable combination. Accordingly, the embodiments are not to be restricted except in light of the attached claims and their equivalents. Also, various modifications and changes may be made within the scope of the attached claims.

[0060] While the foregoing has described what are considered to be the best mode and/or other examples, it is understood that various modifications may be made therein and that the subject matter disclosed herein may be implemented in various forms and examples, and that the teachings may be applied in numerous applications, only some of which have been described herein. It is intended by the following claims to claim any and all applications, modifications and variations that fall within the true scope of the present teachings.

[0061] Unless otherwise stated, all measurements, values, ratings, positions, magnitudes, sizes, and other specifications that are set forth in this specification, including in the claims that follow, are approximate, not exact. They are intended to have a reasonable range that is consistent with the functions to which they relate and with what is customary in the art to which they pertain.

[0062] The scope of protection is limited solely by the claims that now follow. That scope is intended and should be interpreted to be as broad as is consistent with the ordinary meaning of the language that is used in the claims when interpreted in light of this specification and the prosecution history that follows and to encompass all structural and functional equivalents. Notwithstanding, none of the claims are intended to embrace subject matter that fails to satisfy the requirement of Sections 101, 102, or 103 of the Patent Act, nor should they be interpreted in such a way. Any unintended embracement of such subject matter is hereby disclaimed.

[0063] Except as stated immediately above, nothing that has been stated or illustrated is intended or should be interpreted to cause a dedication of any component, step, feature, object, benefit, advantage, or equivalent to the public, regardless of whether it is or is not recited in the claims.

[0064] It will be understood that the terms and expressions used herein have the ordinary meaning as is accorded to such terms and expressions with respect to their corresponding respective areas of inquiry and study except where specific meanings have otherwise been set forth herein. Relational terms such as first and second and the like may be used solely to distinguish one entity or action from another without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms "comprises," "comprising," or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element proceeded by "a" or "an" does not, without further constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

[0065] The Abstract of the Disclosure is provided to allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the foregoing Detailed Description, it can be seen that various features are grouped together in various examples for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claims require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed example. Thus, the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

What is claimed is:

1. A pitch evaluation system comprising:

a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane and output a measured position of the thrown baseball;

a recording device in communication with an intended pitch location system to receive and store an intended pitch location transmitted by the intended pitch location system; and

a command determination device coupled to the recording device and the measuring device configured to receive and compare the intended pitch location with the measured position and output a command parameter indicating a measure of difference between the intended pitch location and the measured position, and the command determination device storing the command parameter in a memory associated with the pitch evaluation system.

2. The pitch evaluation system of claim **1**, wherein the pitch evaluation system is associated with an intended pitch communication system comprising:

a transmitter configured to provide the pitcher with the intended pitch location; and

a pitcher receiver configured receive the intended pitch location and to signal the pitcher with the intended pitch location.

3. The system of claim **1**, wherein the measuring device is configured to measure the position in space of a thrown baseball by radar.

4. The system of claim **1**, wherein the measuring device is configured to measure the position in space of a thrown baseball optically.

5. The system of claim **1**, wherein the command parameter is output to a display.

6. The system of claim **1**, wherein the memory is a local memory.

7. The system of claim **1**, wherein the memory is a remote memory.

8. The system of claim **1**, wherein the pitcher receiver is an audio receiver.

9. The system of claim **1**, wherein the pitcher receiver is a display receiver configured to generate a representation of the command parameter on a display of the display receiver.

10. The system of claim **1**, wherein the transmitter is a push button transmitter.

11. The system of claim **10**, wherein the push button transmitter is configured for wearing and using on field during a game.

12. The system of claim **1**, wherein the recording device includes a receiver configured to receive the intended pitch location and store the intended pitch location with a time the intended pitch location was received at the recording device.

13. The system of claim **1**, wherein the recording device includes a receiver configured to receive the intended pitch location and store the intended pitch location in a buffer.

14. The system of claim **1**, wherein the command determination device is a computer that is configured to determine a difference in position between the intended pitch location and the measured position.

15. A pitch evaluation system comprising:

a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane and output a measured position of the thrown baseball;

a recording device in communication with an intended pitch location system to receive and store an intended pitch location transmitted by the intended pitch location system; and

a command determination device coupled to the recording device and the measuring device configured to receive and compare the intended pitch location with the measured position and output a command parameter indicating a measure of difference between the intended pitch location and the measured position, and the command determination device storing the command parameter in a memory associated with the pitch evaluation system.

16. The pitch evaluation system of claim **15**, wherein the pitch evaluation system comprises an intended pitch communication system comprising:

a transmitter configured to provide a pitcher with the intended pitch location; and

a pitcher receiver configured receive the intended pitch location and to signal the pitcher with the intended pitch location.

17. The pitch evaluation system of claim **15**, wherein the measuring device is configured to measure the position in space of a thrown baseball by radar or to measure the position in space of a thrown baseball optically.

18. A method of measuring the command of a pitcher using a pitch evaluation system, the method comprising the steps of:

recording an intended pitch location in relation to a strike zone using a recording device in communication with an intended pitch location system to receive and store an intended pitch location transmitted by the intended pitch location system;

measuring a position of a thrown pitch using a measuring device having at least one sensor configured to measure a position in space of a thrown baseball when the thrown baseball crosses a specified vertical plane and output a measured position of the thrown baseball;

comparing the measured position to the intended pitch location using a command determination device to determine a distance between the measured position and the intended pitch location to form a measure of command of the pitcher; and

storing the measure of command of the pitcher in a memory associated with the pitch evaluation system.

19. The method of claim **18**, wherein the measuring the position of the thrown pitch further comprises measuring the position in space of a thrown baseball by radar.

20. The method of claim **18**, wherein the measuring the position of the thrown pitch further comprises measuring the position in space of a thrown baseball optically.

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