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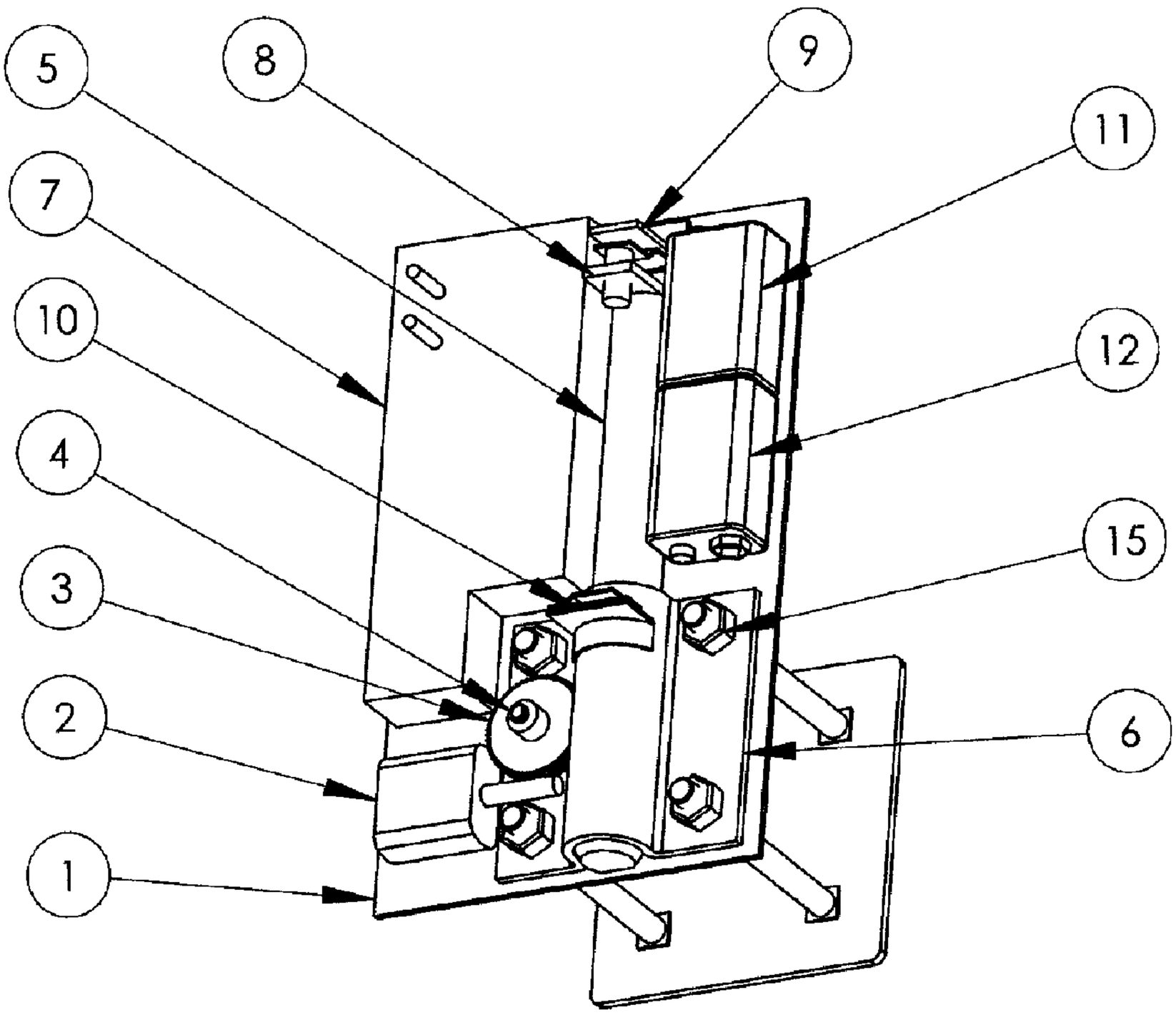
(54) Titre : SYSTEME DE VERROUILLAGE DE PORTE TELECOMMANDE A PENNE DORMANT
(54) Title: REMOTE CONTROLLED DEADBOLT DOOR LOCKING SYSTEM



(57) Abrégé/Abstract:
The remote controlled deadbolt door locking system (the "unit") is designed to be an add-on locking mechanism for doors. The unit is designed to be mounted onto the bottom corner of a door, and when in the engaged position, it prevents said door from being

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(57) Abrégé(suite)/Abstract(continued):
opened. The unit uses a DC motor to move a shaft into a hole drilled into the floor. The unit is mounted onto the door with four carriage bolts through the door, and a mounting plate on the outside of the door. The unit's circuit warns the user if there is a low battery condition or battery failure, and/or the shaft does not fully engage upon closing. The operation of the unit is accomplished through a keyless entry device. In this way, the unit acts just like a simple dead bolt, but one that can be locked from outside.

Abstract

The remote controlled deadbolt door locking system (the “unit”) is designed to be an add-on locking mechanism for doors. The unit is designed to be mounted onto the bottom corner of a door, and when in the engaged position, it prevents said door from being opened. The unit uses a DC motor to move a shaft into a hole drilled into the floor. The unit is mounted onto the door with four carriage bolts through the door, and a mounting plate on the outside of the door. The unit’s circuit warns the user if there is a low battery condition or battery failure, and/or the shaft does not fully engage upon closing. The operation of the unit is accomplished through a keyless entry device. In this way, the unit acts just like a simple dead bolt, but one that can be locked from outside.

Remote Controlled Deadbolt Door Locking System - Specifications

This invention relates to a remotely operated electromechanical deadbolt mechanism used to secure a door. It is intended, but not limited to use for home residences.

The common deadbolt, especially when mounted onto the bottom of a door and engaged into a hole drilled in the floor (a foot-lock), is inaccessible from the outside, making it one of the simplest and safest methods for securing a door. The disadvantage of the deadbolt, however, is that it cannot be locked from outside of the house, unlike the common tumbler lock or a keypad lock. Whilst these locks offer the homeowner the ability to lock the door from the outside, they leave themselves open to tampering, and are also not as strong as the deadbolt when the door is subjected to an impact force.

Our solution to this problem is the amalgamation of the advantages of each of the aforementioned devices: the simple deadbolt and the simple lock. Our invention involves a simple motorized deadbolt unit, which, in response to a unique signal from a remote control, keypad entry, fingerprint, retina, or voice recognition device, will either extend the bolt - locking the door, or retract the bolt – unlocking the door. In this way, the door can now be locked and unlocked from either inside or outside the house.

The complete unit is shown in figures 1 and 2. Fig 1 shows the fully assembled unit as it would be mounted on a door: with mounting plate (13), carriage bolts (14), and cover (16). Figures 3,4, and 5 show the unit mounted onto a door. The following is a list of the main components of the unit:

1. base plate
2. motor
3. reducing worm gear (driving gear)
4. gear mounting stud
5. shaft (bolt)
6. shaft securing plate
7. circuit
8. shaft mounted contactor
9. retract limit switch contact
10. extend limit switch contact
11. main battery
12. backup battery

13. mounting plate
14. carriage bolts
15. mounting nuts
16. cover
17. offset spacer
18. bushing

I Mounting the unit to the door is accomplished by using a provided template to mark the locations of the four through-holes at the bottom corner of the door. The four holes are drilled through the entire thickness of the door, and with cover (16) removed, the unit is then mounted to the inside of the door with four carriage bolts (14), mounting nuts (15), and mounting plate (13). An offset spacer (17) is placed between the door and the base plate (1). The template is again used to mark the precise location of the hole in the floor whilst the door is closed. This hole then receives a metal bushing (18), into which the bolt (5) will engage. The bushing is held down to the floor by a provided adhesive. (See Figs. 3, 4, and 5)

II The overall function of the unit is to slide the shaft into the receiving bushing mounted in the floor. This is accomplished after the circuit-mounted receiver, receives the 'lock' signal from the transmitter, which is accomplished by pressing the appropriate button on the sending unit by the operator. (similar to a door lock/unlock keychain for automobile door locks).

III Once the circuit (7) receives said signal from the transmitter, it turns the motor (2) on. The motor shaft has an attached worm, which meshes with the appropriate reducing worm gear (3), which in turn, meshes with teeth cut into the side of the shaft (5). The shaft securing plate (6) has a slot through the side facing the gear (3), which allows said gear to operate the shaft (5). The shaft then extends linearly downward. A flat milled along one side of the shaft, perpendicular to the gear teeth, prevents the shaft from rotating. The shaft is held in place, and thus holds the door in place by the shaft securing plate (6).

IV The motor runs and hence the shaft extends in this way until the end of travel limit switch is triggered when the shaft mounted contactor (8) reaches the switch for the extended position (10). At this time, the motor turns off. The door is now secured with the engaging end of the shaft inside the floor bushing, and the other end held to the door by the shaft securing plate.

- There may arise a time when the shaft does not fully engage into the bushing. (e.g. the door is not closed properly). If this happens, the shaft will not extend all the way, and thus the shaft contactor does not make contact with the end of travel switch. If this contact does not occur within the nominal closing time, the circuit will sense this condition via an overtimer circuit and automatically reverse the motor and retract the shaft back to the fully retracted (unlocked) position (see part V for unlocking sequence) At the same time, an audible alarm will warn the operator that something is wrong. This alarm will sound for a set period of time.

V When the operator wishes to unlock the door (ie disengage the unit), he/she presses the unlock button on the remote controller, and the motor runs in reverse and retracts the shaft until the shaft mounted contactor (8), reaches the end of travel limit switch for the retracted position (9), at which point the circuit turns the motor off. We are now back at section II.

Additional Specifications

The power to the unit is provided by a standard battery. A secondary battery of the same type provides power if the main battery falls to a low level, or in the unlikely event that the main battery fails. When either of these two conditions is reached, the circuit automatically switches to the backup battery and an LED turns on to show that the battery needs to be replaced. This light will remain on until said battery is replaced. In the event that both batteries fall to a low level, both LED's will be lit, and also an audible alarm will sound until at least one of the batteries is replaced. In addition, the unit will retract the bolt to the unlocked position and prevent any future operations until the batteries are replaced. This prevents the unwanted condition of the unit getting stuck in the locked position when the operator is outside of the house.

Other mounting possibilities

Owing to the unit's straightforward method of mounting, it is possible to mount the unit sideways on the door, so that the bolt engages horizontally into a clasp mounted to the door frame, instead of into a floor mounted bushing. Although this configuration is intrinsically weaker than the proposed floor mounted one, it may be more desirable for those who do not wish to drill their floor.

Claims

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

1. An electromechanical device that is mounted on the inside of a door, capable of being controlled from either side of the door, where a steel shaft is completely external to the door, comprising:

- a steel shaft;

- a bushing for receiving the steel shaft;

- a DC motor, including a worm attached to the output shaft, that engages the steel shaft in order to extend or retract the steel shaft into or out of the bushing;

- two electrical contact switches to determine the engaged or the retracted positions of the steel shaft;

- a contact mounted to the steel shaft, which contacts either one of the two electrical contact switches;

- a steel support stamping which securely holds and guides the steel shaft;

- the worm, for driving a worm gear, that is attached to the output shaft, wherein when driven by the worm, the worm gear engages meshing teeth on one side of the steel shaft through a slot of the steel support stamping to drive the steel shaft.

- a steel support stamping which securely holds and guides said shaft, and through which the door is securely held closed;

- a printed circuit board (PCB), to control the DC motor according to user input;

- a primary battery and a backup battery that supply power to the PCB, which automatically switches power from the primary battery to the backup battery in the event of a low power condition in the primary battery;

- a warning system with audible alarm and two warning LED's, contolled by the PCB to warn user of a low battery condition and engagement problems;

- an overtimer circuit, whose function is to reverse the DC motor to retract the steel shaft, if the steel shaft does not reach the fully extended position in a set period of time;

- a failsafe system controlled by the PCB to retract the steel shaft, and prevent future operation if the primary and backup batteries fall to a low level;

- a cover having two holes through which the two warning LED's can be seen, and also having one cutout to allow the steel shaft to pass through;

- a base plate to which the electromechanical device is assembled;

- a mounting plate through which 4 carriage bolts hold the electromechanical device onto the door, which also keeps the door securely closed;

- a spacer which mounts between the device and the door, whose function is to allow the shaft and bushing centerline to be placed at the correct location from the bottom of the door frame for proper installation.

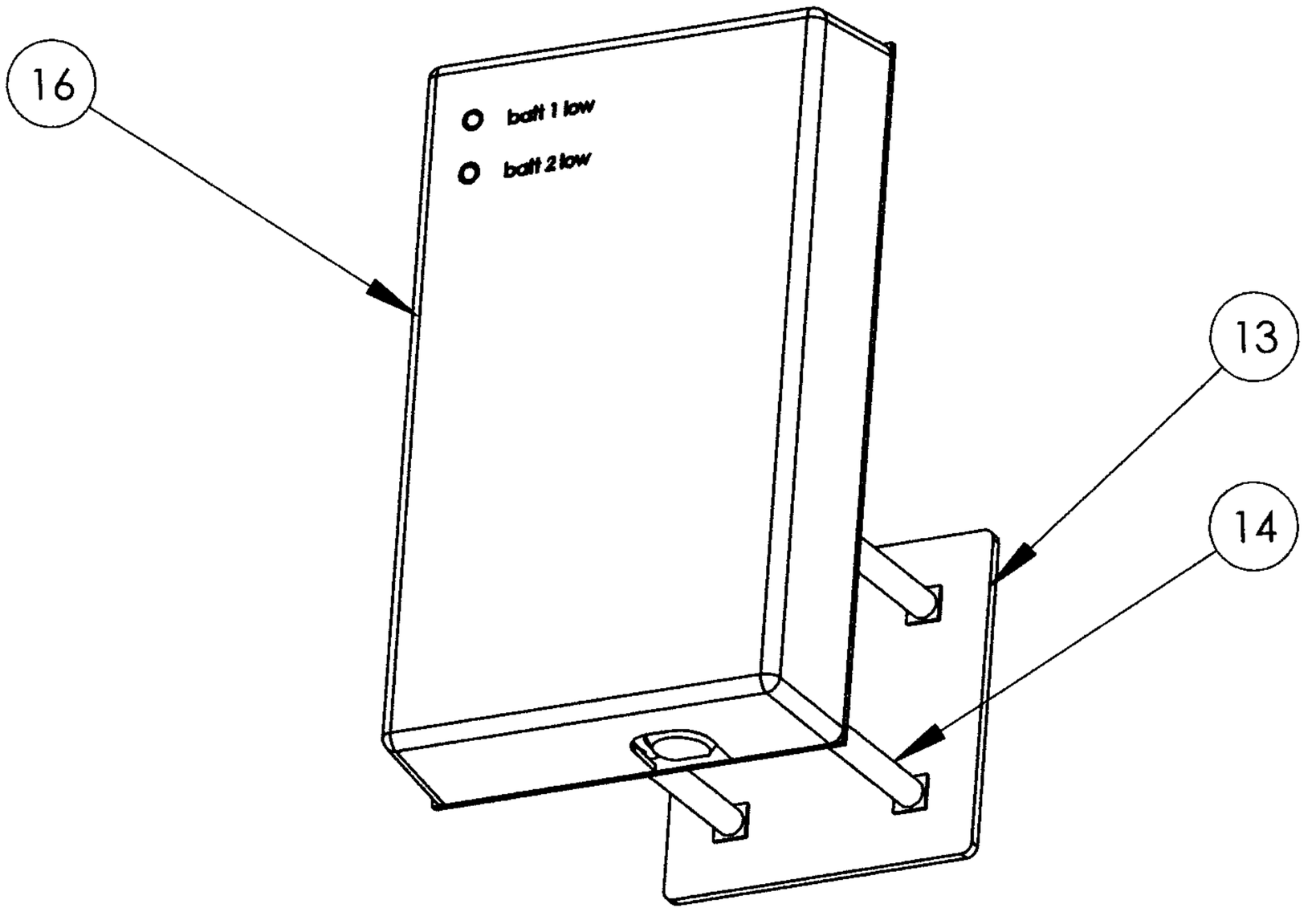


FIG. 1

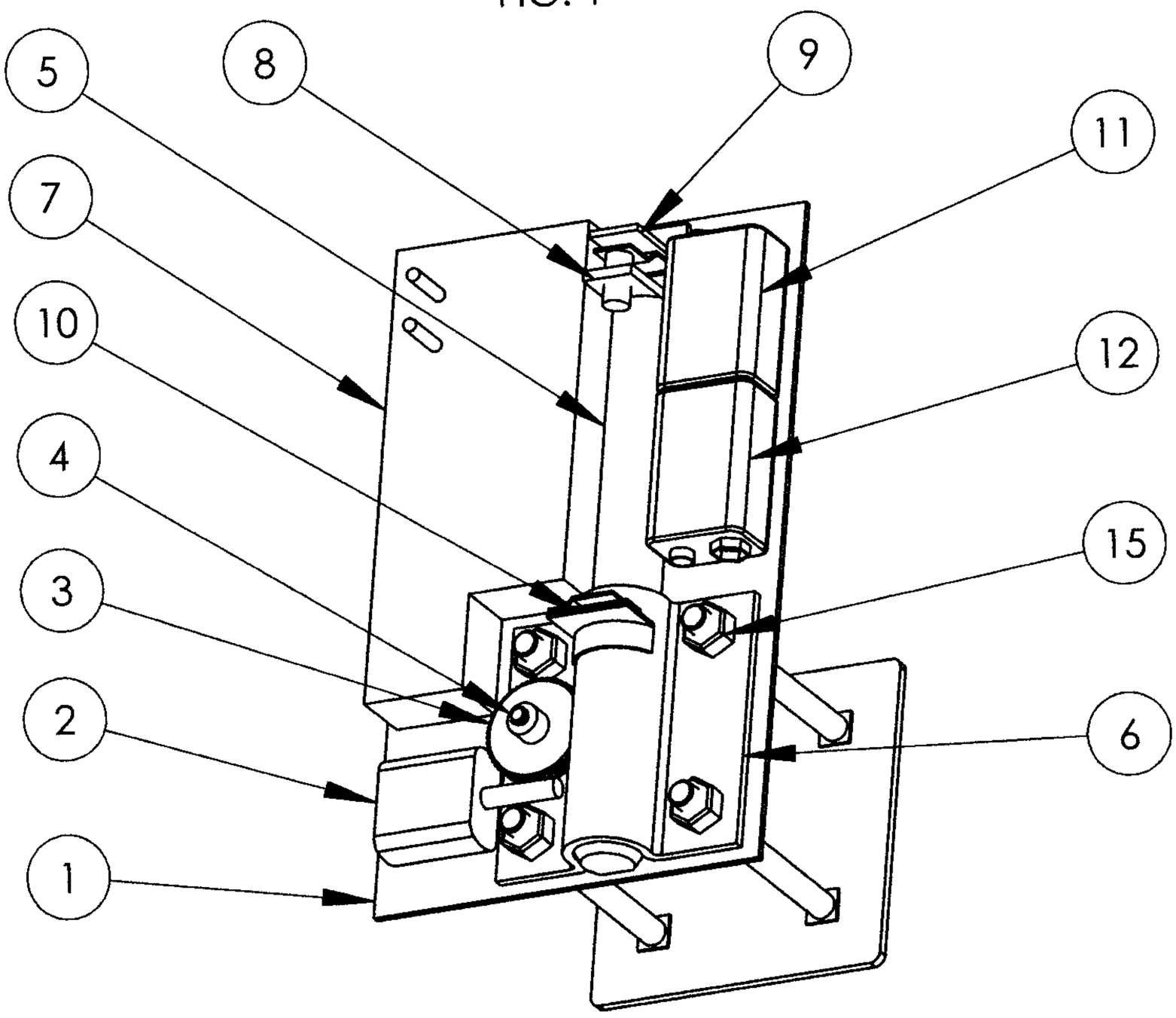


FIG. 2

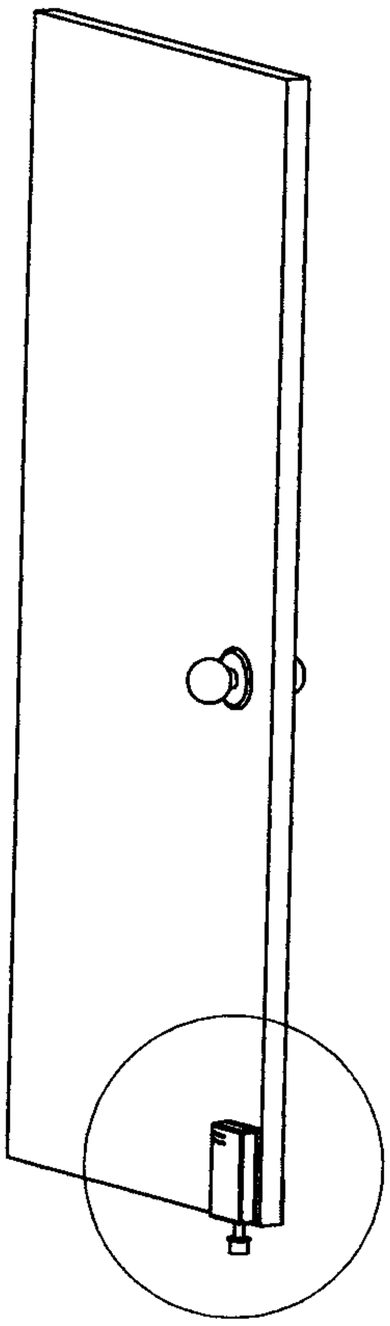


FIG. 3

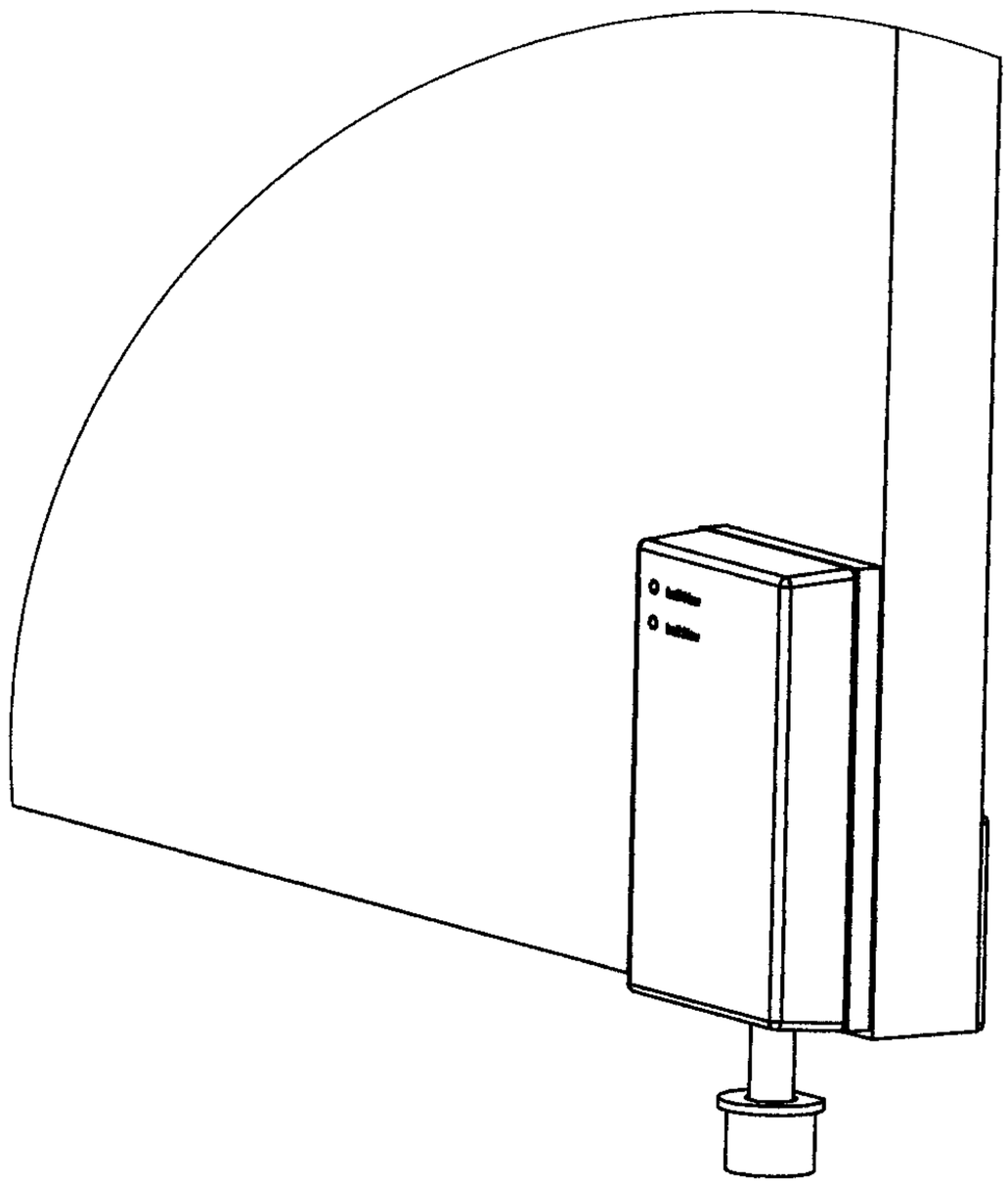


FIG. 4
(CLOSE-UP OF FIG 3)

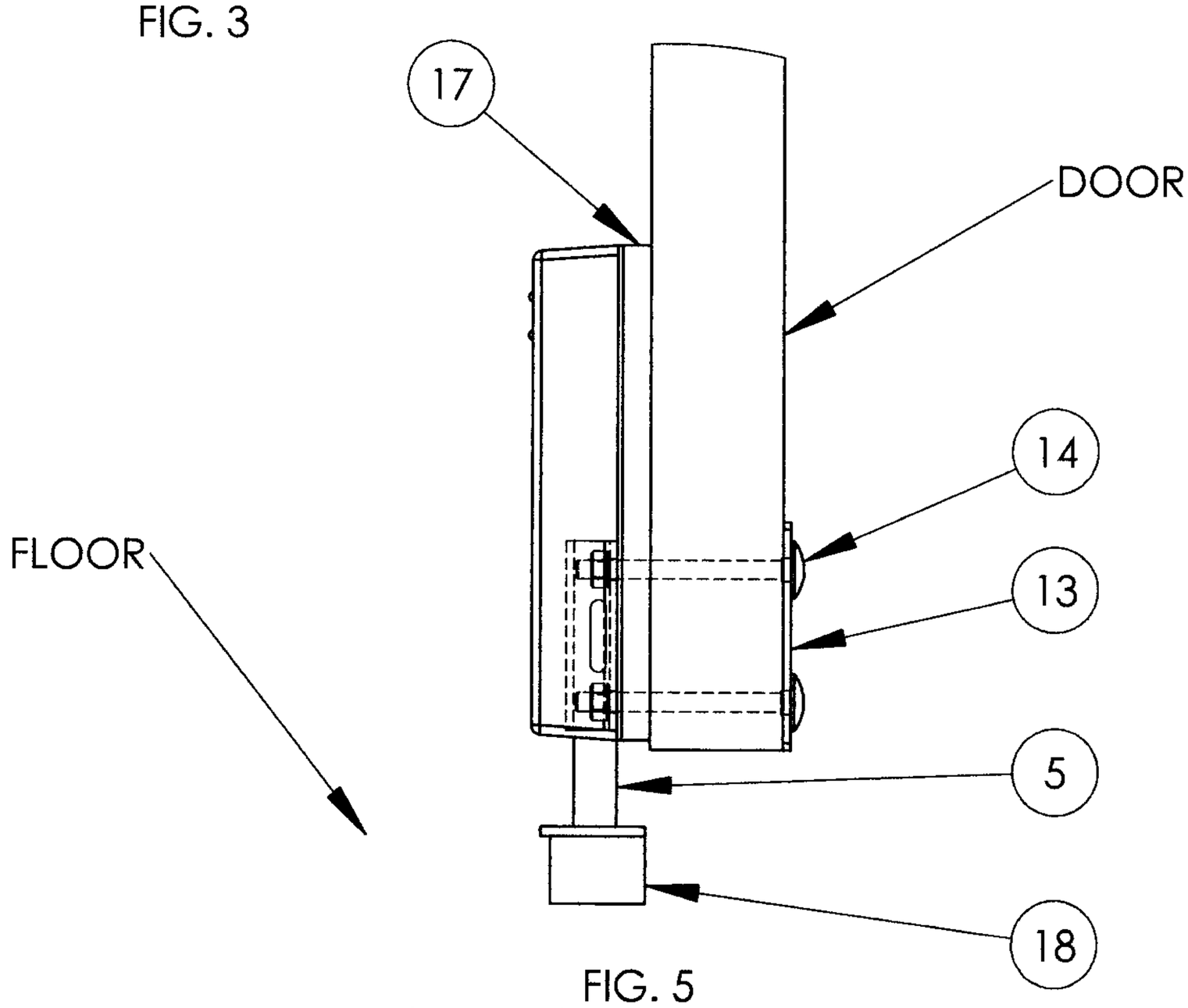


FIG. 5
(EDGE-ON VIEW OF DOOR)

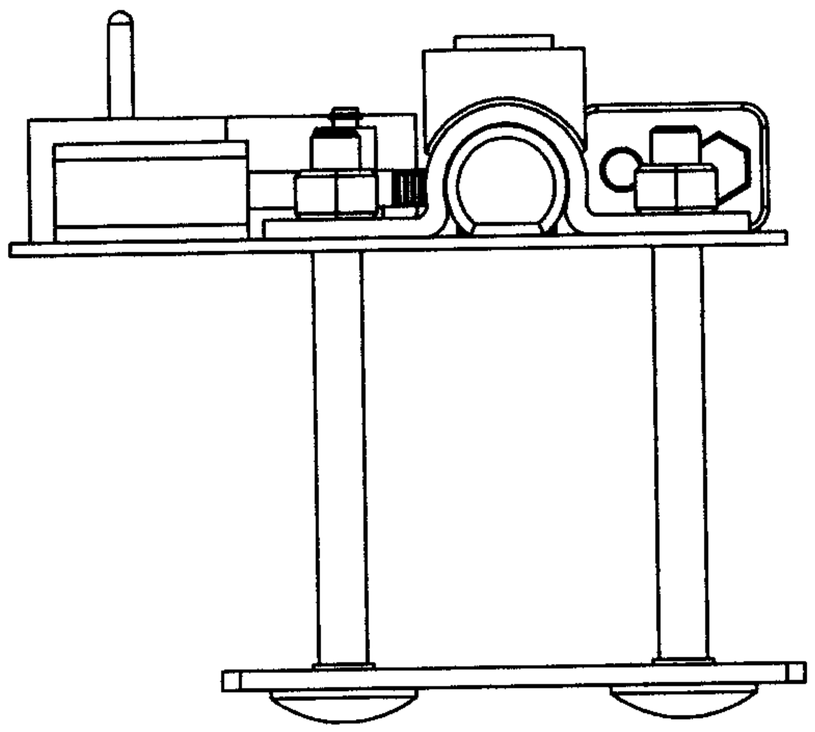


FIG. 6

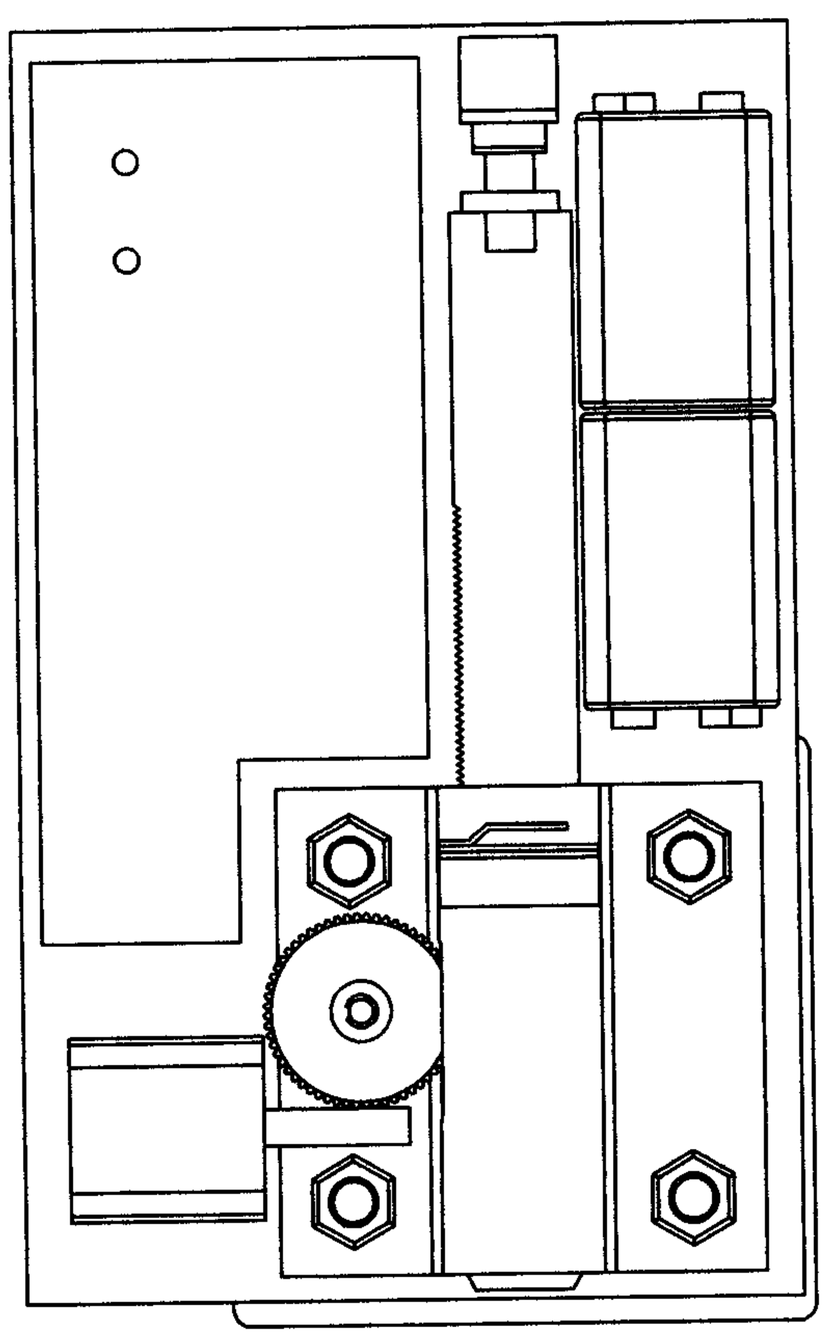


FIG. 7

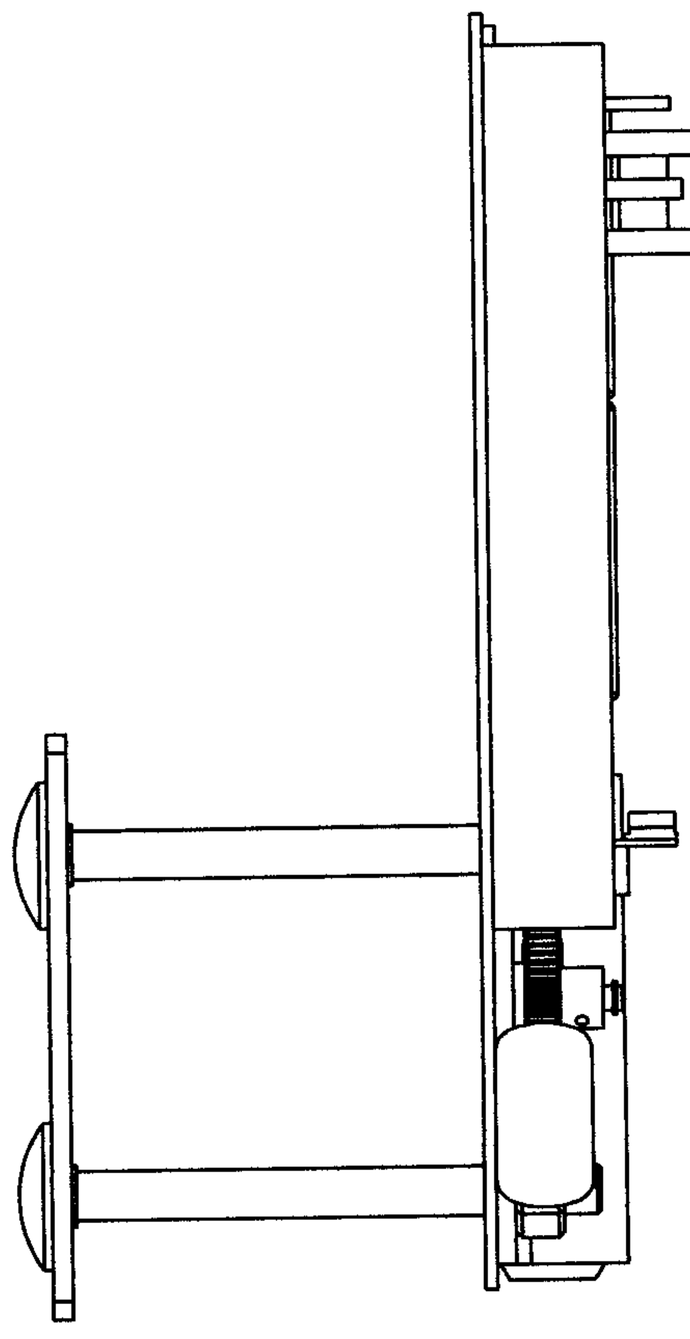
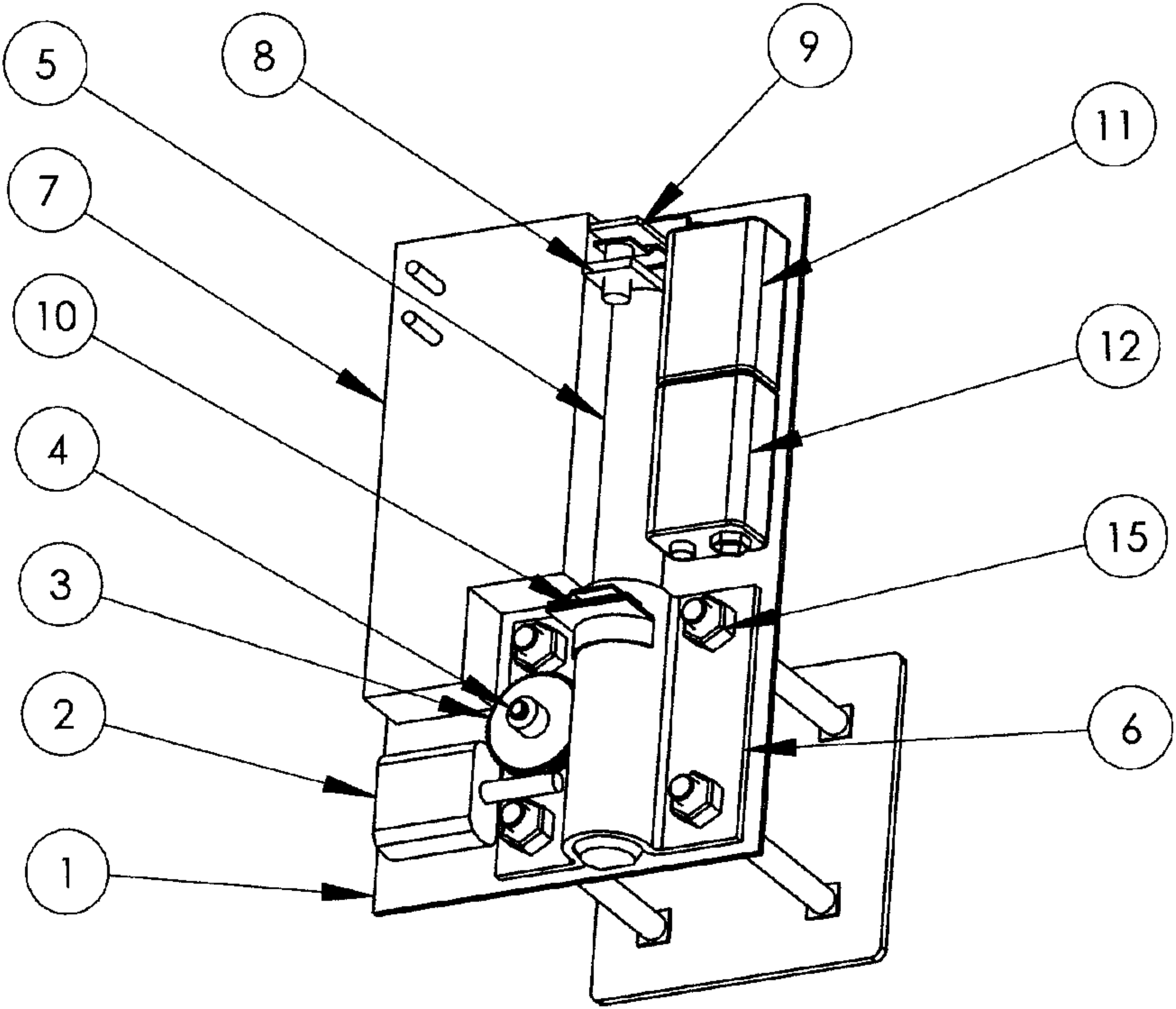


FIG. 8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