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ACCESS OPENING CLOSURE DEVICE

Abstract

An access opening closure device is provided for enabling passage of food or medication into a confined space without providing direct access from within the confined space to outside of the confined space. The device includes a housing assembly including a body and a cover, and a slide assembly including an access door and a frame. The body defines a receptacle and first and second openings. The housing assembly is pivotally coupled to the slide assembly and is movable from an operative position to a stowed, non-operative position.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a divisional of U.S. patent application Ser. No. 17/443,142, filed Jul. 21, 2021. The entire contents of the foregoing application are incorporated by reference herein.

FIELD

[0002] The disclosure relates to an access opening closure device for allowing articles to pass through an otherwise impervious wall. More specifically, the disclosure relates to an access opening closure device for use in prisons and hospital psychiatric wards which allows an article to be passed through a cell or hospital room door without exposing a guard or hospital attendant to possible injury or battery by the prisoner or patient.

BACKGROUND

[0003] Access opening closure devices for allowing passage of food or medication through prison cell and hospital room doors without exposing a prison guard or clinician to a person within the cell or room are well known. Such access opening closure devices provide selective access to a prison cell or hospital room through an opening in the prison cell or hospital room door without unlocking and opening the hospital or prison cell door. U.S. Pat. Nos. 6,302,325, 6,598,546, 6,817,481, and 9,016,558 disclose known closure devices and are incorporated herein by reference in their entirety.

[0004] Known access closure devices may be subject to tampering by inmates or patients. Such tampering may disable or reduce the effectiveness of the access closure device.

SUMMARY

[0005] Aspects of this disclosure are directed to an access opening closure device that includes a housing assembly and a slide assembly. The housing assembly has a body that defines a receptacle, a first opening, a second opening, and a bore. The slide assembly includes a frame and an access door. The frame includes a stabilizing member and defines a frame opening. The access door is supported on the frame and is movable between a closed position covering the frame opening and an open position uncovering the frame opening. The housing assembly is pivotably supported on the frame of the slide assembly between a non-operative position in which the first opening of the body of the housing assembly is pivoted away from the frame opening in the frame of the slide assembly and an operative position in which the first opening of the body of the housing assembly is aligned with the frame opening in the frame of the slide assembly. The stabilizing member of the frame is received within the bore of the housing assembly when the housing assembly is in the operative position.

[0006] In aspects of the disclosure, the access opening closure device includes a housing assembly lock that is supported on the frame of the slide assembly and is configured to retain the housing assembly in the operative position and is operable to allow the housing assembly to be pivoted to the non-operative position.

[0007] In some aspects of the disclosure, a cover is supported on the body of the housing assembly and is movable from a closed position covering the second opening of the body to an open position uncovering the second opening of the body.

[0008] In certain aspects of the disclosure, a cover lock is supported on the cover and is configured to retain the cover in its closed position and operable to facilitate movement of the cover from its closed position to its open position.

[0009] In aspects of the disclosure, the cover lock includes a bolt and a strike, and a shroud is secured to the cover to obstruct access to the bolt and the strike.

[0010] In some aspects of the disclosure, the shroud includes gripping flanges that facilitate placement of the shroud onto the cover.

[0011] In certain aspects of the disclosure, the frame of the slide assembly includes an upper wall, a

lower wall, and a vertical strut, and the upper and lower walls each have first and second end portions.
[0012] In aspects of the disclosure, the first end portions of the upper and lower walls are coupled together by the vertical strut, and the second end portions of the upper and lower walls are spaced from each other to define an opening that receives the access door when the access door is in its closed position.
[0013] In some aspects of the disclosure, first and second stop members are supported on the access door, and the first stop member engages a first side of the vertical strut when the access door is in its open position and the second stop member engages a second side of the vertical strut when the access door is in its closed position.
[0014] In certain aspects of the disclosure, the access door of the slide assembly includes first and second vertically oriented cylinders and the frame of the slide assembly includes first and second vertically oriented shafts that support pistons that are received within the first and cylinders such that the access door is movable vertically between its open and closed positions.
[0015] In aspects of the disclosure, a biasing member is positioned within each of the first and second cylinders, and each of the biasing members is positioned between the closed end of the respective first or second cylinder and the respective piston to urge the access door towards the open position.
[0016] In some aspects of the disclosure, the biasing members include coil springs.
[0017] In certain aspects of the disclosure, the access door includes a side wall that has a toothed rack, and the frame of the slide assembly supports an access door lock that is movable from a locked position engaged with the toothed rack to an unlocked position disengaged from the toothed rack.
[0018] In aspects of the disclosure, the access door lock includes a pawl member, an actuation knob, and a cam member, and the actuation knob is secured to the cam member and is movable to move the cam member into engagement with the pawl member to move the pawl member from a first position engaged with the toothed rack to a second position disengaged from the toothed rack.
[0019] In some aspects of the disclosure, the pawl member is engaged with the toothed rack in the locked position of the access door lock and disengaged from the toothed rack in the unlocked position of the access door lock.
[0020] In certain aspects of the disclosure, the access door lock includes a lock member that is movable from a first position engaged with the pawl member to prevent movement of the pawl member from its first position to its second position to a second position spaced from the pawl member to allow movement of the pawl member from its first position to its second position.
[0021] In aspects of the disclosure, the slide assembly includes a plunger that is supported on the frame, and the access door defines a plunger opening that is aligned with and receives the plunger when the access door is in the open position to retain the access door in its open position.
[0022] Other aspects of the disclosure are directed to an access opening closure device that includes a housing assembly, a cover lock, a shroud, and a slide assembly. The housing assembly has a body that defines a receptacle, a first opening, and a second opening. The cover is supported on the body of the housing assembly and is movable from a closed position covering the second opening of the body to an open position uncovering the second opening of the body. The cover lock is supported on the cover of the housing assembly and includes a bolt and a strike. The cover lock is configured to retain the cover in its closed position and operable to facilitate movement of the cover from its closed position to its open position. The shroud is secured to the cover to obstruct access to the bolt and the strike of the cover lock. The slide assembly includes a frame and an access door. The frame defines a frame opening. The access door is supported on the frame and is movable between a closed position covering the frame opening and an open position uncovering the frame opening. The housing assembly is pivotably supported on the frame of the slide assembly between a non-operative position in which the first opening of the body of the housing assembly is

pivoted away from the frame opening in the frame of the slide assembly and an operative position in which the first opening of the body of the housing assembly is aligned with the frame opening in the frame of the slide assembly.
[0023] In aspects of the disclosure, the shroud includes gripping flanges that facilitate placement of the shroud onto the cover.
[0024] Other aspects of the disclosure are directed to an access opening closure device that includes a housing assembly and a slide assembly. The housing assembly has a body that defines a receptacle, a first opening, and a second opening. The slide assembly includes a frame and an access door. The frame defines a frame opening. The access door is supported on the frame and is movable between a closed position covering the frame opening and an open position uncovering the frame opening. The housing assembly is pivotably supported on the frame of the slide assembly between a non-operative position in which the first opening of the body of the housing assembly is pivoted away from the frame opening in the frame of the slide assembly and an operative position in which the first opening of the body of the housing assembly is aligned with the frame opening in the frame of the slide assembly. The access door of the slide assembly includes first and second vertically oriented cylinders and the frame of the slide assembly includes first and second vertically oriented shafts. Each of the first and second shafts supports a piston that is received within one of the first and cylinders such that the access door is movable vertically between its open and closed positions.
[0025] In aspects of the disclosure, a biasing member is positioned within each of the first and second cylinders between the closed end of the respective first or second cylinder and the respective piston to urge the access door towards the open position.
[0026] In some aspects of the disclosure, the access door includes a side wall that has a toothed rack and the frame of the slide assembly supports an access door lock that is movable from a locked position engaged with the toothed rack to an unlocked position disengaged from the toothed rack.
[0027] Other features of the disclosure will be appreciated from the following description.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0028] Various aspects of the disclosed access opening closure device are described herein with reference to the drawings, wherein:
[0029] FIG. **1** is a perspective view from above of the disclosed access opening closure device in its operative position with an access door and a cover locked in a closed position;
[0030] FIG. **2** is a perspective view from above of the access opening closure device shown in FIG. **1** with a slide assembly separated from a housing assembly;
[0031] FIG. **3** is a front, perspective view of the access opening closure device shown in FIG. **1** in a stowed position with the housing assembly pivotally secured to a frame of a slide assembly;
[0032] FIG. **4** is a side perspective view from the rear end of the housing assembly of the access opening closure device shown in FIG. **1** with the cover in the open position;
[0033] FIG. **5** is a front view of the frame of the slide assembly of the access opening closure device shown in FIG. **1**;
[0034] FIG. **6** is a cross-sectional view taken along section line **6-6** of FIG. **5**;
[0035] FIG. **7** is a perspective view of the slide assembly of the access opening closure device shown in FIG. **2** with the access door separated from the frame;
[0036] FIG. **8** is a side perspective view of the slide assembly of the access opening closure device shown in FIG. **7** with the access door supported on the frame in an open position;
[0037] FIG. **9** is a side perspective view of the slide assembly shown in FIG. **8** with the access door

supported on the frame in the closed position;
[0038] FIG. **10** is a side perspective view of a lock for locking the access door of the access opening closure device shown in FIG. **1**.
[0039] FIG. **11** is a front view, partially in phantom, of the lock shown in FIG. **10** mounted to the frame of the slide assembly shown in FIG. **2** in the locked position;
[0040] FIG. **12** is a front view, partially in phantom, of the lock shown in FIG. **10** mounted to the frame of the slide assembly shown in FIG. **2** in the unlocked position;
[0041] FIG. **13** is a perspective view from the front of the slide assembly secured to a door with the access door in the closed position;
[0042] FIG. **14** is a perspective view from the front of the access opening closure device shown in FIG. **1** supported on a door with the cover in an open position and the access door in the closed position;
[0043] FIG. **15** is a perspective view from the front of the access opening closure device shown in FIG. **1** with the access door and the cover in the closed position; and
[0044] FIG. **16** is a perspective view from the front of the access opening closure device shown in FIG. **1** with the access door of the slide assembly in the open position and the cover in the closed position;
[0045] FIG. **17** is a perspective view from above of the disclosed access opening closure device shown in FIG. **1** in its operative position with the access door and cover locked in a closed position and further including a tamper proof lock shroud assembly;
[0046] FIG. **17**A is a side perspective view of a flange bolt of the tamper proof lock shroud assembly shown in FIG. **17**;
[0047] FIG. **18** is an enlarged perspective view of the tamper proof lock shroud and cover lock shown in FIG. **17**;
[0048] FIG. **19** is side perspective view of an alternate version of the access opening closure device shown in FIG. **1** with the slide assembly separated from the housing assembly and in the closed position;
[0049] FIG. **20** is a side perspective view of the slide assembly of the access opening closure device shown in FIG. **19**;
[0050] FIG. **21** is a side perspective view of the access opening closure device shown in FIG. **19** with the slide assembly pivotably coupled to the housing assembly in the stowed position;
[0051] FIG. **22** is a side perspective view of another alternate version of the access opening closure device shown in FIG. **1** in the operative position with the cover and the access door in closed positions;
[0052] FIG. **23** is a side perspective view of the access opening closure device shown in FIG. **22** in the operative position with the cover in the closed position and the access door in the closed position;
[0053] FIG. **24** is a front view shown partially in phantom of an access door lock of the access opening closure device shown in FIG. **23** with the access door lock in an unlocked position; and
[0054] FIG. **25** is a front view shown partially in phantom of the access door lock shown in FIG. **24** with the access door lock in a locked position.

DETAILED DESCRIPTION

[0055] The disclosed access closure device will now be described in detail with reference to the drawings in which like reference numerals designate identical or corresponding elements in each of the several views. However, it is to be understood that disclosed aspects of the surgical stapling device are merely exemplary of the disclosure and may be embodied in various forms. Well-known functions or constructions are not described in detail to avoid obscuring the disclosure in unnecessary detail. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the disclosure in virtually any appropriately

detailed structure.

[0056] FIGS. **1-9** illustrate the disclosed access opening closure device, shown generally as access opening closure device **10**, which includes a slide assembly **12** and a housing assembly **14** that are removably secured together. The slide assembly **12** includes a frame **16** and a slidable access door **18**. The frame **16** defines a channel **16***a* (FIG. **6**) for slidably receiving the access door **18**. The frame **16** also defines an opening **20** (FIG. **5**) which is covered by the access door **18** when the access door **18** is in a closed position (FIG. **9**) and uncovered by the access door **18** when the access door **18** is moved to an open position (FIG. **8**). In aspects of the disclosure, the frame **16** includes a pair of plates **23** which are separated by spacers **23***a* (FIG. **6**) to define the channel **16***a* along which the access door **18** is slidable between the open and closed positions. Alternately, other frame constructions are envisioned.

[0057] FIGS. **2**, **3**, and **5-9** illustrate the frame **16** of the slide assembly **12** which includes a first lock mounting portion **24**, a second lock mounting portion **26**, a vertical strut **28**, and a pair of hinge members **30**. The frame **16** also defines a plurality of through bores **34** to facilitate securement of slide assembly **12** about the opening of a support structure such as a prison cell door, hospital door or the like, using bolts (not shown). A plurality of through bores **32** are also provided on the first and second lock mounting portions **24** and **26** to facilitate securement of locks to the frame **16**. The through bores **32** and/or **34** may be threaded or include a threaded insert to improve securement of the slide assembly **12** to the support structure or to facilitate securement of a lock to the frame **16**.

[0058] FIGS. **1-9** illustrate the access door **18** of the slide assembly **12** which includes a handle **42**, a catch or strike **44**, and a stop member **46**. The handle **42** is secured to a first end of access door **18** and provides a gripping surface to facilitate movement of the access door **18** between the open and closed positions. The strike **44** is positioned beneath the first lock mounting portion **24** when the access door **18** is in the closed position (FIG. **1**) and is positioned to receive the bolt **50** of an access door lock **52** (FIGS. **10-11**) to lock the access door **18** in the closed position. The stop member **46**, which may be a screw which is threaded to access door **18**, is secured to the access door **18** within the opening **20** and defines a projection. The screw **46** defines the open and closed positions of the access door **18** of the slide assembly **12** and is positioned to engage the vertical strut **28** of the frame **16** of the slide assembly **12** when the access door **18** is in the open position (FIG. **8**) and is positioned to engage the end **16***a* of the frame **16** opposite the vertical strut **28** when the access door **18** is in the closed position (FIG. **9**).

[0059] FIGS. **10-12** illustrate the access door **18** which includes a top wall that defines a toothed rack **56** having a plurality of teeth **56***a* (FIG. **2**B). Each tooth **56***a* has a triangular shape with a substantially vertical wall and a sloped wall. The vertical wall of each tooth **56***a* prevents movement of the access door **18** towards the open position, whereas the sloped wall of each tooth **56***a* facilitates movement of the access door **18** towards the closed position. A ratchet member **60** is supported adjacent the first lock mounting portion **24** on the frame **16** of the slide assembly **12** and is biased into contact with the teeth **56***a* of rack **56**. The ratchet member **60** is pivotally supported within the frame **16** about a pivot member **59** and includes an L-shaped body having a vertical leg **60***a* and a horizontal leg **60***b*. In aspects of the disclosure, the ratchet member **60** is biased into contact with the rack **56** by a biasing member, e.g., spring **64**, which urges a pin or rod (not shown) into contact with vertical leg **60***a* of ratchet member **60**. Alternately, the use of other biasing members or assemblies is envisioned.

[0060] The vertical leg **60***a* of the ratchet member **60** extends into an opening **66** defined in the first lock mounting portion **24**. When the access door lock **52** is supported on the first lock mounting portion **24**, a cam member **68** of the access door lock **52** is positioned within the opening **66** such that when a key (not shown) is inserted into a key slot **70** (FIGS. **11** and **12**) of the access door lock **52** and turned to lift the bolt **50** from strike **44**, the cam member **68** is rotated into engagement with the vertical leg **60***a* of the ratchet member **60** (FIG. **12**) to disengage the horizontal leg **60***b* of the

ratchet member **60** from engagement with the rack **56**. This allows the access door **18** to be freely moved between the opened and closed positions. In aspects of the disclosure, the access door lock **52** is rotatable between three positions. In the first position, the lock bolt **50** is engaged with the strike **44** and the ratchet member **60** is engaged with the rack **56**. In the second position, the lock bolt **50** is disengaged with the strike **44** and the ratchet member **60** remains engaged with rack **56**. In the third position, the lock bolt **50** is disengaged from the strike **44** and the ratchet member **60** is disengaged from the rack **56**. In the first position, the access door **18** is locked in the closed position. In the second position, the access door **18**, if not already in the closed position, is only movable towards the closed position. Finally, in the third position, the access door **18** may be moved freely between the open and closed positions.

[0061] FIGS. **2** and **3** illustrate the frame **16** of slide assembly **12** which includes structure for pivotally attaching the slide assembly **12** to the housing assembly **14**. In aspects of the disclosure, the hinge members **30** are supported below the opening **20** on frame **16** of the slide assembly **12**. The hinge members **30** include cylindrical posts **30***a* (FIG. **2**) that are dimensioned to be slidably received in cylindrical bearings or hinge members **80** (FIG. **4**) supported on a bottom surface of housing assembly **14** to pivotally secure housing assembly **14** to the frame **16** of the slide assembly **12**. Although not shown, the cylindrical posts **30***a* may define threaded bores which receive bolts to prevent removal of the bearings **80** from the hinge members **30** and, thus, prevent removal of the housing assembly **14** from the slide assembly **12**. As shown in FIG. **3**, the slide assembly **12** is pivotal from an operative position FIG. **1** to a stowed or non-operative position as described in further detail below.

[0062] FIGS. **2-4** illustrate the housing assembly **14** which includes a body **90** that defines a receptacle **90***a*. Although the body **90** of the housing assembly **14** is illustrated as being substantially rectangular, other body configurations are envisioned. In aspects of the disclosure, the body **90** of the housing assembly **14** includes a front wall **92**, a pair of side walls **94**, and a bottom wall **96**. The bottom wall **96** may include one or more drain openings **98** (FIG. **4**) to facilitate drainage of fluid from within the receptacle **90***a* of the housing assembly **14** which may spill into receptacle **90***a*. A cover **100** is movably secured to the body **90** of the housing assembly **14** to enclose the receptacle **90***a* in a closed position (FIG. **1**) and provide access to the receptacle **90***a* in an open position (FIG. **4**). Although body **90** of housing assembly **14** is illustrated as having an open top which is enclosed by a movable cover **100**, it is envisioned that the top surface of body **90** may be enclosed by a fixed wall and that one of the side walls **94** or front wall **92** may be replaced with a removable cover. In aspects of the disclosure, the cover **100** is formed from a substantially transparent material such as Lexan®. Alternately, other materials of construction are envisioned.

[0063] The cover **100** is connected by a hinge **103** (FIG. **4**) to a top edge of front wall **92** of body **90** of the housing assembly **14**. Alternatively, the cover **100** can be movably mounted to the body **90** in a variety of different ways including by slidably mounting the cover **100** to body **90**. In aspects of the disclosure, the cover **100** may be urged by a spring member **105** to an open position. The spring member **105** may be incorporated into the hinge **103**. Although the hinge **103** is shown to be positioned on the top edge of the front wall **92**, the cover **100** may be hinged to the top edge **107** on a rear end of body **18** or to a top edge of either of sidewalls **94**.

[0064] FIGS. **1** and **3** illustrate the cover **100** which includes a top surface **100***a* and defines a series of openings **101** (FIG. **3**). The openings **101** may be threaded to facilitate securement of a cover lock **102** (FIG. **1**) to cover **100** (FIG. **8**). The cover lock **102** is like the access door lock **52** and includes a bolt **104** which is movable to engage a strike **106** supported on the body **90** of the housing assembly **14** to lock the cover **100** in the closed position.

[0065] FIGS. **3** and **4** illustrate the body **90** of the housing assembly **14** which defines a rear opening **110** that is positioned opposite to the front wall **92** of the body **90** of the housing assembly **14** above the cylindrical bearings **80**. The housing assembly **14** is mountable to the slide assembly **12** by slidably positioning the cylindrical bearings **80** on the cylindrical posts **30***a* of the hinge

members **30** (FIG. **3**). The housing assembly **14** is pivotable in relation to the frame **16** of the slide assembly **12** from a first stowed or non-operative position to an operative position. In the stowed position shown in FIG. **3**, the housing assembly **14** is positioned beneath the opening **20** of frame **16**. In the operative position shown in FIG. **1**, the rear opening **110** of housing assembly **14** is positioned in communication with opening **20** of frame **16** and the access door **18** can be moved from the closed position shown in FIG. **16** to the open position shown in FIG. **14** to provide access to the receptacle **90***a* of housing assembly **14**.

[0066] To retain the housing assembly **14** in the operative position, a housing assembly lock **120** is mounted on the second lock mounting portion **26** of the frame **16**. The housing assembly lock **120** includes a bolt **122** (FIG. **13**) which is received in a recess **124** (FIG. **2**) formed in an upper side of the body **90** of the housing assembly **14** to prevent housing assembly **14** from pivoting about hinge members **30** from the operative position to the stowed position. To position the housing assembly **14** in the stowed position, the housing assembly lock **120** can be operated with a key (not shown) to lift the bolt **122** from within the recess **124** of body **90** of the housing assembly **14**. When this occurs, gravity will cause the housing assembly **14** to pivot about hinge members **30** to the lowered position. To prevent slamming, the pivoting movement of housing assembly **14** can be controlled by grasping the body **90** of the housing assembly **14**.

[0067] FIGS. **13-16** illustrate use of the access opening closure device **10**. To use the access opening closure device **10**, the slide assembly **12** is secured to a support structure **200** such as a hospital or prison door using bolts or the like such that the opening **20** in the frame **16** of the slide assembly **12** is aligned with an opening (not shown) formed in the support structure **200**. Thereafter, the access door lock **52** can be operated with a key to allow the access door **18** to be selectively moved between the open and closed positions to allow selective access to the opening in the support structure **200**. The slide assembly **12** is usable independently of the housing assembly **14** to allow or prevent access through the opening in the support structure **200**. More specifically, if it is desired to limit direct access through the opening in the support structure **200** to the outside world, the housing assembly **14** can be pivotably secured to the slide assembly **12** by positioning the cylindrical bearings **80** of body **90** of housing assembly **14** about hinge members **30**. Thereafter, the housing assembly **14** can be pivoted to the operative position. The housing assembly lock **120** can be operated with a key (not shown) to retain the housing assembly **14** in the operative position. In the operative position, the cover lock **102** can be operated with a key (not shown) to facilitate movement of the cover **102** from the closed position to the open position (FIG. **14**) and provide access to the receptacle **90***a* of the housing **90** while the access door **18** of the slide assembly **12** is closed. Thereafter, the cover **100** can be moved to the closed position to cover receptacle **90***a* and the access door **18** can be opened to provide access to the receptacle **90***a* through the opening in the support structure and the opening **110** in body **90** of the housing assembly **14**. See FIG. **16**. At any time, if housing assembly **14** is not required, the housing assembly lock **120** can be actuated with a key to allow housing assembly **14** to be pivoted to the stowed (FIG. **3**).

[0068] Although not shown, the key operated locks **52**, **102** and **120** may have spring-loaded bolts such that the bolts may be key operated to open the locks but will automatically return to their locked positions engaged with their respective strikes. In addition, it is noted that only key operated locks are specifically disclosed in this application to control operation of the access door **18**, the cover **100** and the pivotally mounted housing assembly **14**. However, it is envisioned that one or more of the access door **18**, cover **100** and housing **14** can be retained in the locked position by other non-key operated locking or latching devices. It is also envisioned that the cover **100** can be formed as a single member or a plurality of members.

[0069] FIGS. **17** and **18** illustrate the access opening closure device **10** (FIG. **1**) with a tamper-proof lock shroud assembly, shown generally as shroud assembly **180**, secured to the cover **100**. The shroud assembly **180** includes a shroud **182** and screws **184**. The shroud **182** is positioned over the bolt **104** and the strike **106** of the cover lock **102**. In aspects of the disclosure, the shroud **182**

includes a body **186** that has a top wall **188** and side walls **190**. The top wall **188** defines openings **192** and is received atop the cover lock **102** to cover the bolt **104** and the strike **106** of the cover lock **102**. The openings **192** receive the screws **184** which extend through openings **194** in the cover lock **102** and the openings **101** (FIG. **2**) in the cover **100** to secure the shroud **182** to the cover lock **102** and the cover **100**. In aspects of the disclosure, the screws **184** include flange nuts (FIG. **17**A) although other types of fastening devices could be used to secure the shroud **182** to the cover lock **100**. When the shroud **182** is secured to the cover lock **102**, the top wall **188** and side walls **190** of the shroud **182** enclose the bolt **104** and the strike **106** to restrict access to these components and prevent tampering with the cover lock **102**. In some aspects of the disclosure, the shroud **182** is positioned adjacent the housing assembly lock **120** to block access through the end of the shroud **182** adjacent the bolt **104** and the strike **106** of the cover lock **102**.

[0070] In aspects of the disclosure, the shroud **182** includes gripping flanges **194** that extend from the top wall **188** outwardly beyond the side walls **190**. The gripping flanges **196** are positioned to be grasped by an installation person during assembly of the shroud **182** to the cover lock **100**.

[0071] FIGS. **19-21** illustrate an alternate version of the access opening closure device shown in FIG. **1** shown generally as access opening closure device **300**. Access opening closure device **300** is similar to access opening closure device **10** (FIG. **1**). As such only the differences between the access opening closure device **10** and access opening closure device **300** will be described in detail herein. Although not shown, the access opening closure device **300** is adapted to include locks **52**, **102**, and **120** (FIG. **1**) in the manner described above in regard to the access opening closure device **10**.

[0072] The access opening closure device **300** includes a slide assembly **312** and a housing assembly **314** that are removably secured together. The slide assembly **312** includes a frame **316** and an access door **318**. The frame **316** defines a channel **316***a* for slidably receiving the access door **318**. The frame **316** of the slide assembly **312** also defines an opening **320** (FIG. **20**) which is covered by the access door **318** when the access door **318** is in a closed position (FIG. **21**) and uncovered by the access door **318** when the access door **318** is moved to an open position. In aspects of the disclosure, the frame **316** and the access door **318** have rectangular configurations although other configurations are envisioned. In aspects of the disclosure, the frame **316** includes plates **323** which are separated by spacers **323***a* (FIG. **6**) to define the channel **316***a* through which the access door **318** is slidable between the open and closed positions.

[0073] Each of the plates **323** of the frame **316** includes upper and lower walls **340**, **342** that have first end portions **340***a*, **342***a* and second end portions **340***b*, **342***b*, and a vertical strut **328** that connects first end portions **340***a*, **342***a* of the upper and lower walls **340**, **342** to each other. In contrast to the frame **16** (FIG. **2**) of access opening closure device **10** (FIG. **1**), the second end portions **340***b*, **342***b* of the upper and lower walls **340**, **342** are spaced from each other to define an opening **344** that receives the access door **318** when the access door **318** is in its closed position. By providing an opening at the second end portion of the frame **316**, the access door **318** can extend to the end of a door (not shown) to which the access opening closure device **300** is secured. It is noted that although the opening **344** is shown on the right side of the slide assembly **312**, the components of the slide assembly **312** could be reversed such that the opening **344** is provided on the left side and the access door **318** slides in the opposite direction. The upper wall **340** of the plate **323** of the frame **316** also includes a stabilizing member **346** that extends towards the housing assembly **314**.

[0074] In aspects of the disclosure, the housing assembly **314** includes a body **390** that defines a receptacle **390***a* and a cover **391** that is pivotably supported on the body **390** as described above regarding cover **100** (FIG. **1**). The body **390** includes a front wall **392** (FIG. **19**), a pair of side walls **394**, a bottom wall **396**, and a rear wall **398** that define the receptacle **390***a*. The rear wall **398** of the housing assembly **314** is rectangular and defines a rectangular opening **399** that communicates with the receptacle **390***a* of the housing assembly **314** when the housing assembly **314** is in its

operative position. The rear wall **398** includes an upper wall portion **398***a* and a lower wall portion **398***b*. The lower wall portion **398***b* supports hinge members **330** and the upper wall portion **398***a* defines a bore **400**. The bore **400** is positioned to receive the stabilizing member **346** when the housing assembly **314** is moved to its operative position in the direction of arrow "A" in FIG. **21** Receipt of the stabilizing member **346** of the frame **316** within the opening **340** of the upper wall portion **398***a* of the rear wall **398** of the housing assembly **314** restricts downward movement of the housing assembly **314** in relation to the frame **316** of the slide assembly **312** when downward pressure is applied to the housing assembly **314** with the housing assembly **314** in the operative position. Downward movement of the housing assembly **314** in relation to the slide assembly **312** may disengage the housing assembly lock **120** (FIG. **1**) to allow the housing assembly **314** to be moved from its operative position to its stowed position.

[0075] The access door **318** supports stop members **402** and **404** that are secured to and extend outwardly of the access door **318**. The stop member **402** is positioned to engage one side of the vertical strut **328** of the frame **316** of the slide assembly **312** when the access door **318** is in the closed position (FIG. **19**) and the stop member **404** is positioned to engage the other side of the vertical strut **328** when the access door **318** is in the open position. As illustrated, the access door **318** is movable along a horizontal axis as it moves between its open and closed positions. It is envisioned that the access door **318** could be provided to move along a vertical axis as it moves between the open and closed positions. FIGS. **22** and **23** illustrate a vertically movable access door **518** which is described in detail below.

[0076] Although not shown, the housing assembly **314** of the access opening closure device includes hinge members that are like the hinge members **80** (FIG. **3**) of the access closure device **10** that are pivotably supported on hinge members **330** of the slide assembly **312** (FIG. **2**) to rotatably support the housing assembly **314** to the slide assembly **312**. In addition, the access opening closure device **300** includes a housing assembly lock similar to housing assembly lock **120** (FIG. **1**) to allow the housing assembly **314** to be retained in its operative position and moved to its stowed position.

[0077] FIGS. **22** and **23** illustrate another alternate version of the access opening closure device shown generally as access opening closure device **500**. Access opening closure device **500** is similar to access opening disclosure devices **100** (FIG. **1**) and **300** (FIG. **19**) and includes a slide assembly **512** and a housing assembly **514**. The housing assembly **514** is substantially similar to the housing assembly **314** and includes a body **502** and a cover **504**. The housing assembly **514** will not be described in further detail herein. The slide assembly **512** includes a frame **516** and an access door **518** that is movable vertically between open and closed positions. The frame **516** includes spaced plates **523** that define a channel **516***a* for slidably receiving the access door **518**. The frame **516** also defines an opening **520** (FIG. **23**) which is covered by the access door **518** when the access door **518** is in a closed position (FIG. **22**) and uncovered by the access door **518** when the access door **318** is in an open position (FIG. **23**). In aspects of the disclosure, the plates **523** are separated by spacers **523***a* (FIG. **22**) to define the channel **516***a* through which the access door **518** is slidable between the open and closed positions.

[0078] In aspects of the disclosure, the access door **518** of the slide assembly **512** includes spaced cylinders **580** that are fixedly secured to the access door **518** and the frame **516** includes two shafts **582** that are fixedly secured to the upper wall **540** of the frame **512**. The spaced cylinders **580** and the shafts **582** are vertically oriented such that the access door **518** is movable vertically between its closed and open positions. The shafts **582** are received within the spaced cylinders **580** and support pistons **584**. Each of the spaced cylinders **580** receives a biasing member **586** that is positioned in compression between a closed end **580***a* of the spaced cylinder **580** and the piston **584** to urge the access door **518** upwardly towards its open position. In aspects of the disclosure, the biasing member **586** includes a coil spring although the use of other types biasing members is envisioned. In some aspects of the disclosure, the access door **518** includes a handle **587** that can be gripped to

move the access door between its closed and open positions.
[0079] In aspects of the disclosure, the access door **518** includes a side wall that defines a toothed rack **556** (FIG. **23**) having a plurality of teeth **556***a*. Each tooth **556***a* has a triangular shape with a substantially horizontal wall and a sloped wall. The toothed rack **556** is engaged with the access door lock **552** to control movement of the access door **518** between the open and closed positions. As described below, the horizontal wall of each tooth **556***a* prevents movement of the access door **518** towards its open position, whereas the sloped wall of each tooth **556***a* facilitates movement of the access door **18** towards its closed position.
[0080] FIGS. **24** and **25** illustrate the access door lock **552** and the toothed rack **556** of the access door **518**. The access door lock **552** includes a pawl assembly **590**, an actuation knob **592**, a cam member **594**, and a lock member **596**. The pawl assembly **590** includes a pawl member **598** and a biasing member **600**. The pawl member **598** is rotatably secured to a housing **602** of the access door lock **552** and is movable from a locked position (FIG. **25**) engaged with the toothed rack **556** of the access door **518** to an unlocked position (FIG. **24**) disengaged from the toothed rack **556** of the access door **518**. The biasing member **600** urges the pawl member **590** towards its locked position. In the locked position, the pawl member **598**, via engagement with the substantially horizontal walls of the teeth **556***a* of the toothed rack **556**, prevents movement of the access door **518** towards the open position, but allows movement of the access door **518** towards the closed position.
[0081] The actuation knob **592** is secured to the cam member **594** and is rotatable to rotate the cam member **594** into engagement with the pawl member **598**. When the actuation knob **592** is rotated in the direction of arrow "A" in FIGS. **23** and **24**, the cam member **594** is rotated into engagement with the pawl member **598** to move the pawl member **598** in the direction of arrow "B" on FIG. **24** from the locked position (FIG. **24**) to the unlocked position (FIG. **25**).
[0082] The lock member **596** includes a grip member **606** and a shaft **608**. The lock member **596** is movable from a locked position to an unlocked position to control movement of the pawl member **594**. More specifically, the shaft **608** extends into the housing **602** of the access door lock **552** and is positioned adjacent the pawl member **598**. In the locked position (FIG. **25**) of the lock member **596**, the shaft **608** of the lock member **596** engages the pawl member **594** to prevent movement of the pawl member **598** from its locked position to its unlocked position. When the lock member **596** is in its locked position, the actuation knob **592** cannot be rotated in the direction of arrow "A" in FIG. **23**. When the lock member **596** is moved to its unlocked position, the shaft **608** of the lock member **596** is moved away from the pawl member **598** to facilitate movement of the pawl member **598** to its unlocked position. In aspects of the disclosure, the lock member **596** can be a push/pull member that can be, e.g., pulled outwardly to move the lock member **596** from the locked position to the unlocked position and pushed inwardly to move the lock member **596** from the unlocked position to the locked position. In aspects of the disclosure, the lock member **596** is biased to the locked position.
[0083] In aspects of the disclosure, the frame **516** of the slide assembly **512** includes a plunger **612** (FIG. **23**) and the access door **516** defines an opening **614** (shown in phantom in FIG. **23**. When the access door **516** is in its open position, the plunger **612** can be pressed inwardly into the opening **614** to retain the access door **516** in the open position.
[0084] The access opening closure device **500** includes a housing assembly lock **620** (FIG. **1**) that functions like housing assembly lock **120** described above to allow the housing assembly **514** to be retained in its operative position to moved to its stowed position.
[0085] Although not shown, the housing assembly **514** includes hinge members that are like the hinge members **80** (FIG. **3**) of the access closure device **10** that are pivotably supported on hinge members on the slide assembly **512** like the hinge members **30** (FIG. **3**) of slide assembly **12** (FIG. **2**) to rotatably support the housing assembly **514** to the slide assembly **512**. It is also noted that although not shown in detail in FIGS. **22** and **23**, the frame **516** of the slide assembly **512** includes

a stabilizing member **346** (FIG. **20**) and the housing assembly **514** defines a bore **400** (FIG. **21**) that receives the stabilizing member **346** to provide added stability to the housing assembly **514** when the housing assembly **514** is in the operative position.

[0086] Persons skilled in the art will understand that the devices and methods specifically described herein and illustrated in the accompanying drawings are non-limiting exemplary aspects of the disclosure. It is envisioned that the elements and features illustrated or described in connection with one exemplary embodiment may be combined with the elements and features of another without departing from the scope of the disclosure. As well, one skilled in the art will appreciate further features and advantages of the disclosure based on the above-described aspects of the disclosure. Accordingly, the disclosure is not to be limited by what has been particularly shown and described, except as indicated by the appended claims.

Claims

1. An access opening closure device comprising: a housing assembly having a body defining a receptacle, a first opening, and a second opening; a slide assembly including a frame and an access door, the frame defining a frame opening, the access door supported on the frame and movable between a closed position covering the frame opening and an open position uncovering the frame opening, the housing assembly pivotably supported on the frame of the slide assembly between a non-operative position in which the first opening of the body of the housing assembly is pivoted away from the frame opening in the frame of the slide assembly and an operative position in which the first opening of the body of the housing assembly is aligned with the frame opening in the frame of the slide assembly; wherein the access door of the slide assembly includes a first vertically oriented cylinder and a second vertically oriented cylinder, and the frame of the slide assembly includes a first vertically oriented shaft and a second vertically oriented shaft, each of the first and second shafts supporting a piston, the pistons received within the first and cylinders such that the access door is movable vertically between the open position and the closed position.

2. The access opening closure device of claim 1, further including a biasing member positioned within each of the first and second cylinders, and wherein each of the biasing members is positioned between the closed end of the respective first or second cylinder and the respective piston, the biasing members positioned to urge the access door towards the open position.

3. The access opening closure device of claim 2, wherein the access door includes a side wall that has a toothed rack, and the frame of the slide assembly supports an access door lock, the access door lock movable from a locked position engaged with the toothed rack to an unlocked position disengaged from the toothed rack.

4. An access opening closure device comprising: a housing assembly having a body defining a receptacle, a first opening, a second opening, and a bore; a slide assembly including a frame and an access door, the frame defining a frame opening, the access door supported on the frame and movable between a closed position covering the frame opening and an open position uncovering the frame opening, the access door of the slide assembly including first and second vertically oriented cylinders and the frame of the slide assembly including first and second vertically oriented shafts, each of the first and second shafts supporting a piston, the pistons received within the first cylinder and second cylinder such that the access door is movable vertically between the open position and the closed position.

5. The access opening closure device of claim 4, further including a biasing member positioned within each of the first and second cylinders, and wherein each of the biasing members is positioned between the closed end of the respective first or second cylinder and the respective piston, the biasing members positioned to urge the access door towards the open position.

6. The access opening closure device of claim 4, wherein the biasing members include coil springs.

7. The access opening closure device of claim 4, wherein the access door includes a side wall that

has a toothed rack, and the frame of the slide assembly supports an access door lock, the access door lock movable from a locked position engaged with the toothed rack to an unlocked position disengaged from the toothed rack.

8. The access opening closure device of claim 7, wherein the access door lock includes a pawl member, an actuation knob, and a cam member, the actuation knob secured to the cam member and being movable to move the cam member into engagement with the pawl member to move the pawl member from a first position engaged with the toothed rack to a second position disengaged from the toothed rack, the pawl member engaged with the toothed rack in the locked position of the access door lock and disengaged from the toothed rack in the unlocked position of the access door lock.

9. The access opening closure device of claim 8, wherein the access door lock includes a lock member, the lock member movable from a first position engaged with the pawl member to prevent movement of the pawl member from its first position to its second position to a second position spaced from the pawl member to allow movement of the pawl member from its first position to its second position.

10. The access opening closure device of claim 4, wherein the slide assembly includes a plunger that is supported on the frame, and the access door defines a plunger opening, the plunger opening aligned with and receiving the plunger when the access door is in the open position to retain the access door in its open position.

11. The access opening closure device of claim 4, wherein the housing assembly is pivotably supported on the frame of the slide assembly between a non-operative position in which the first opening of the body of the housing assembly is pivoted away from the frame opening in the frame of the slide assembly and an operative position in which the first opening of the body of the housing assembly is aligned with the frame opening in the frame of the slide assembly.