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(54) **VEHICLE DOOR LATCH**

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Publication Classification

(51) **Int. Cl.**

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E05B 81/06	(2006.01)
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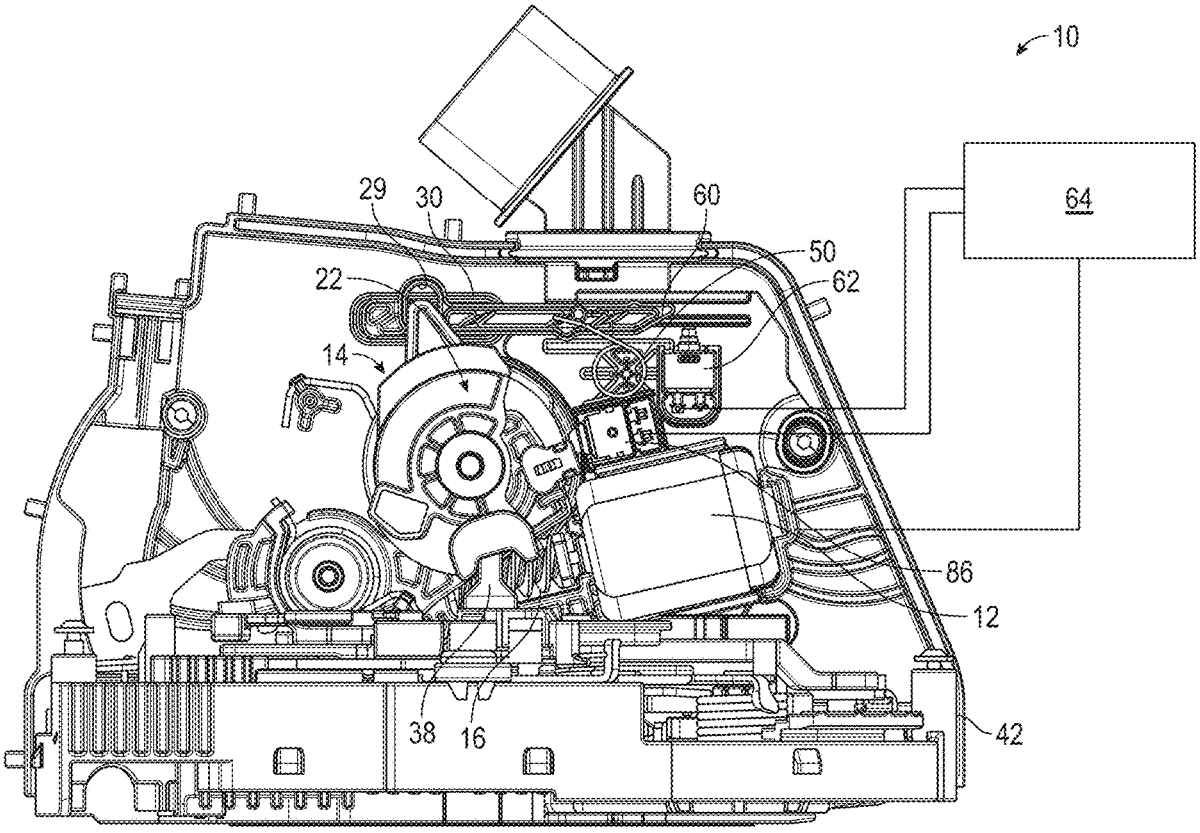
E05B 81/34	(2006.01)
E05B 81/42	(2006.01)
E05B 81/46	(2006.01)
E05B 81/90	(2006.01)

(52) **U.S. Cl.**

CPC ***E05B 81/14*** (2013.01); ***E05B 81/06*** (2013.01); ***E05B 81/30*** (2013.01); ***E05B 81/34*** (2013.01); ***E05B 81/42*** (2013.01); ***E05B 81/46*** (2013.01); ***E05B 81/90*** (2013.01)

(57) **ABSTRACT**

A vehicle latch, including: a drive assembly, wherein the drive assembly includes a power release gear, a reset lever secured to one side of the power release gear and a gear lock lever located on an opposite side of the power release gear, the gear lock lever rotatably mounted to the power release gear and the reset lever; a switch link operably coupled to the gear lock lever; a clutch mechanism operably coupling the switch link to the reset lever; and a motor operably coupled to the drive assembly via a worm secured to a shaft of the motor, wherein rotation of the drive assembly by the worm performs one of a locking function and a power release of the vehicle latch.



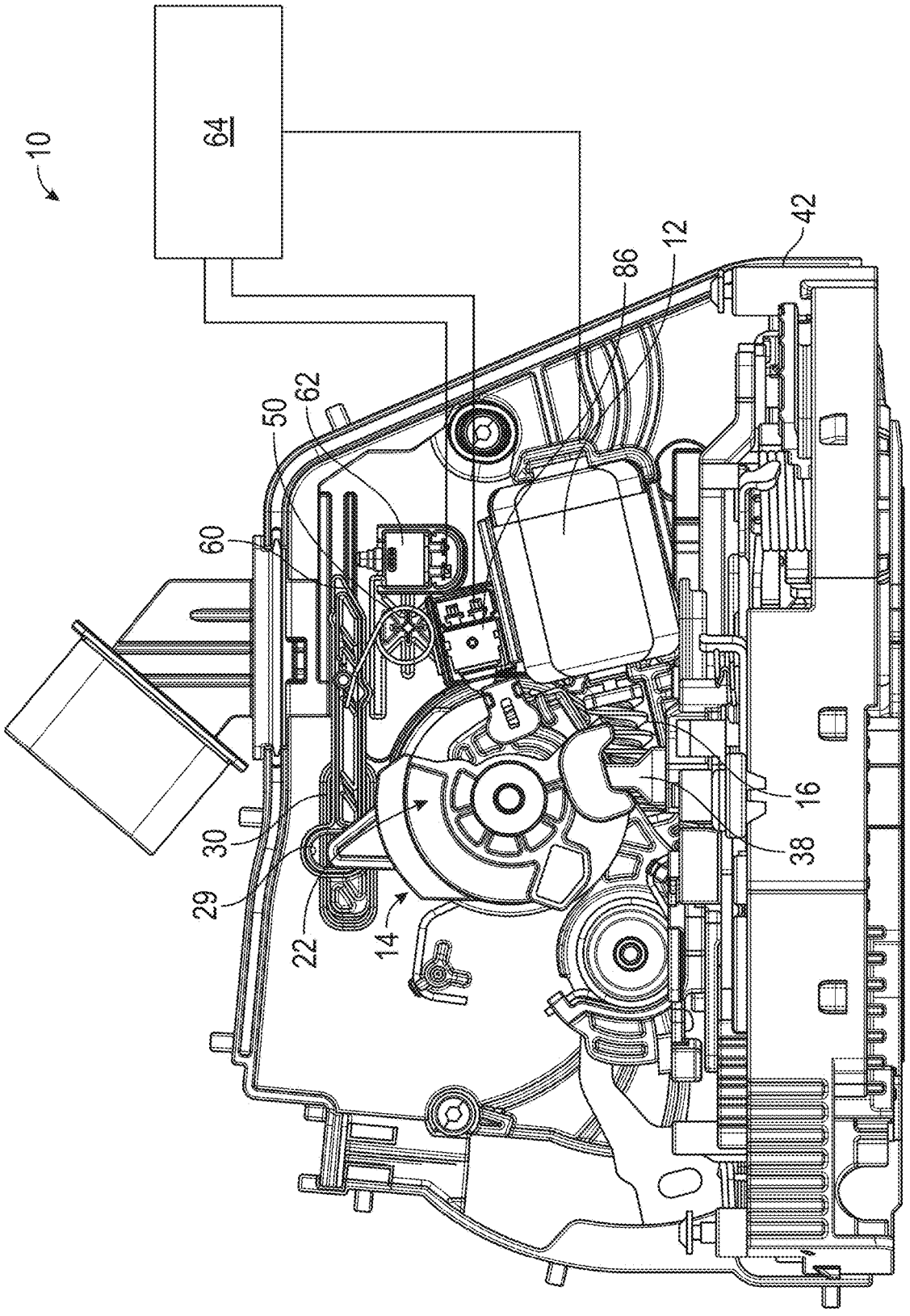


FIG. 1

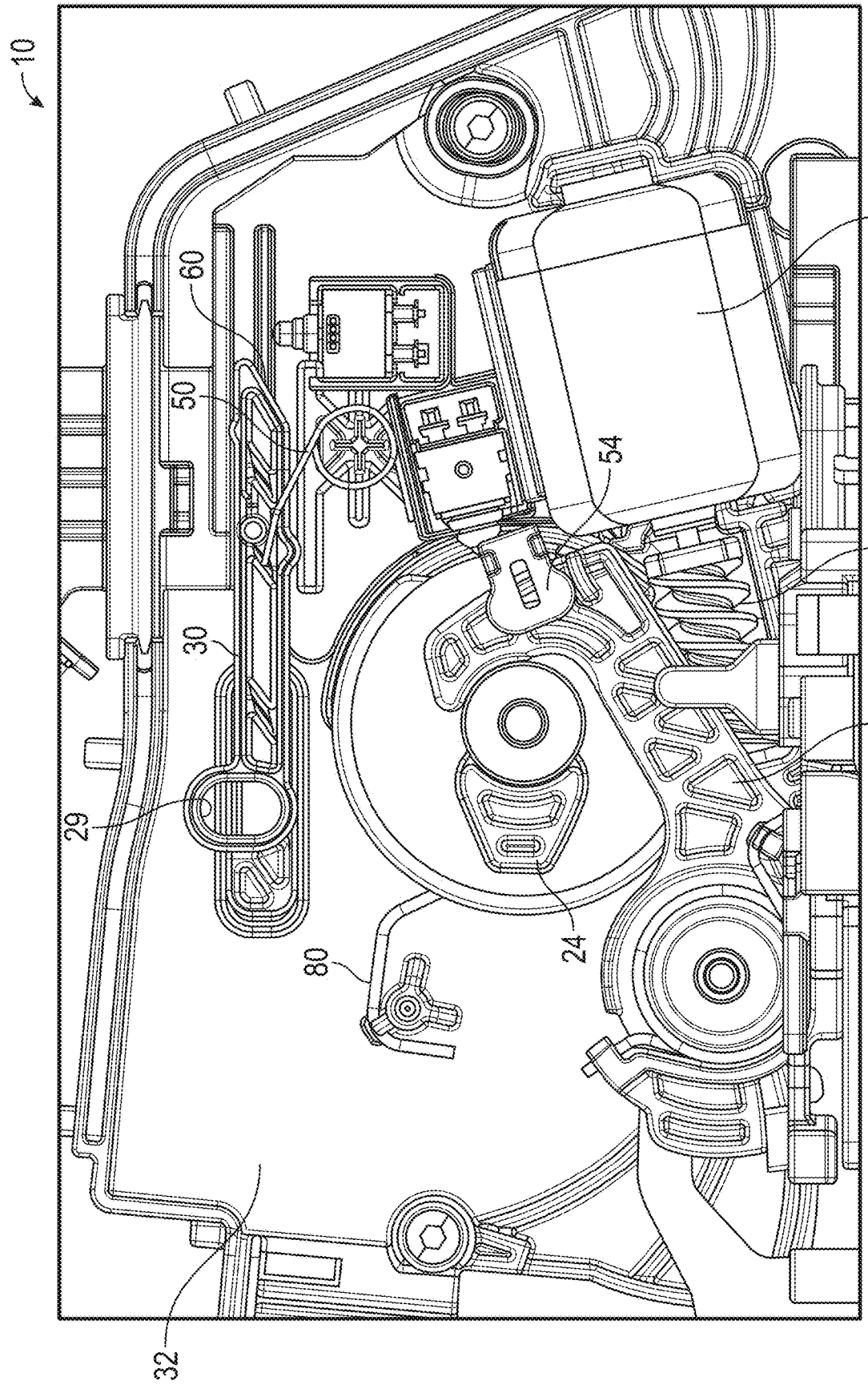


FIG. 1A

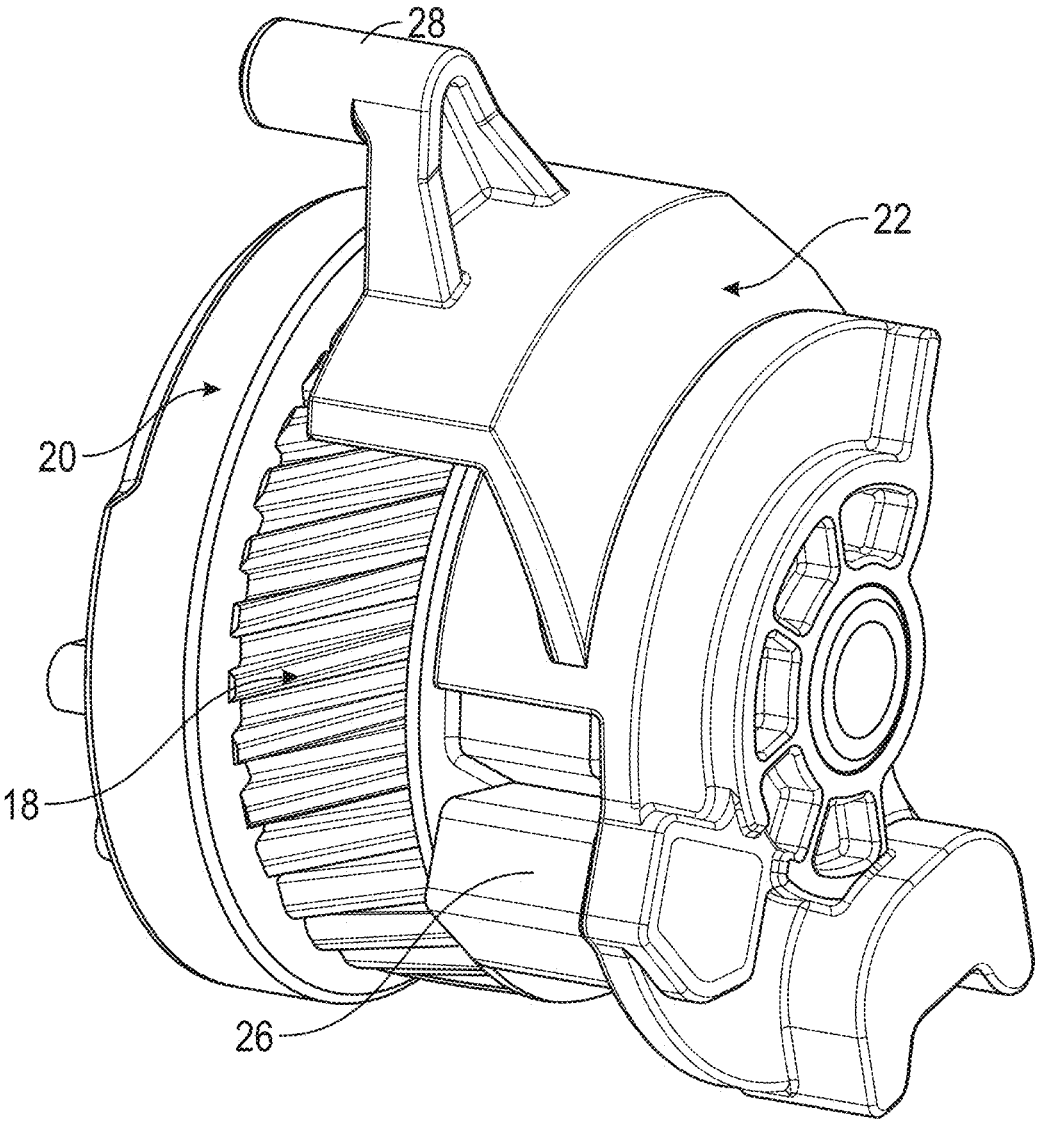


FIG. 2

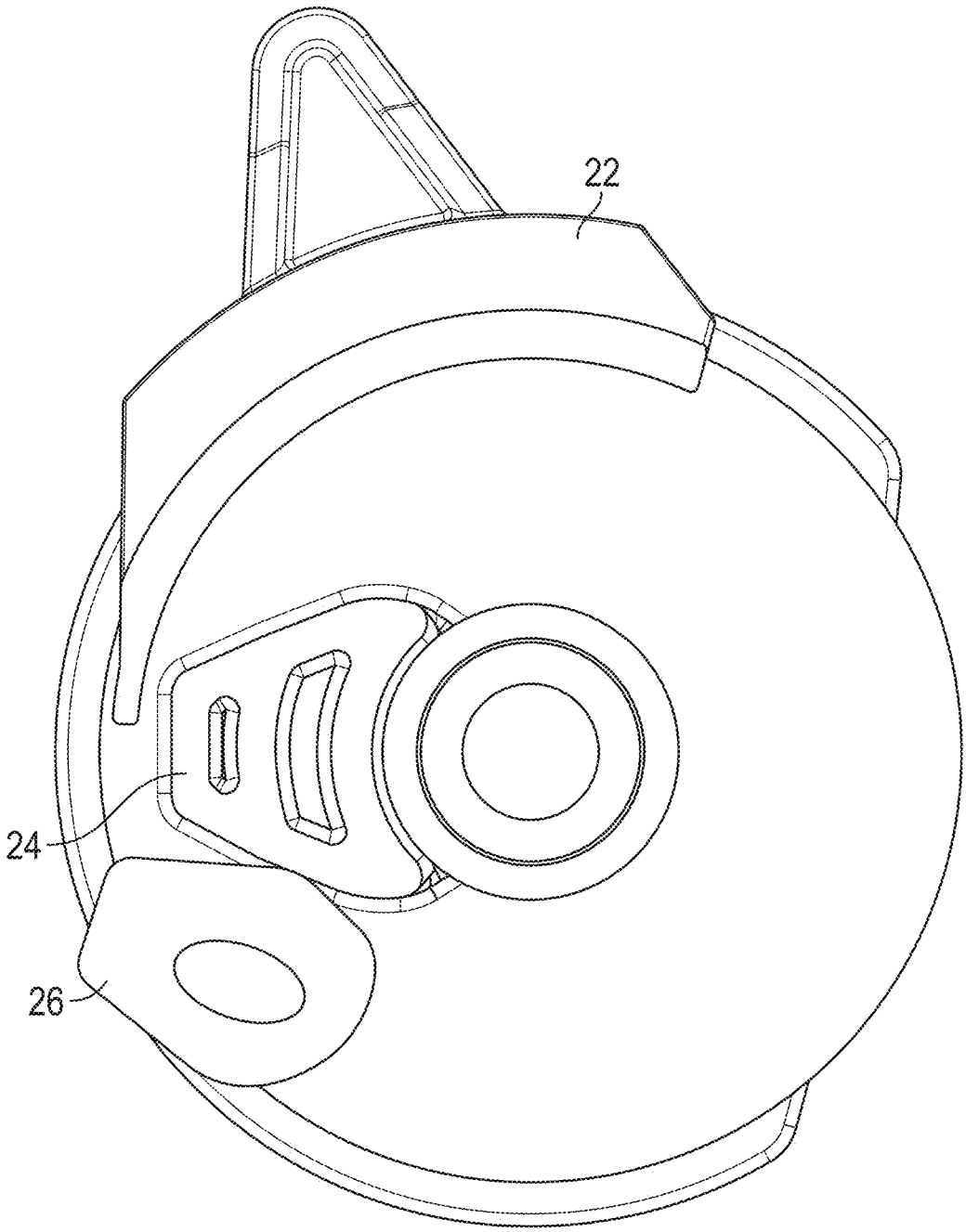


FIG. 2A

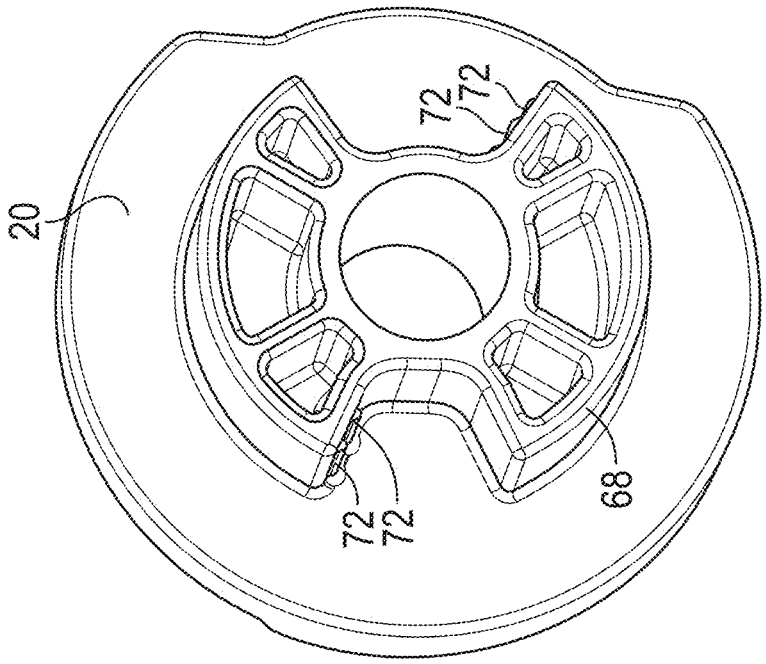


FIG. 2C

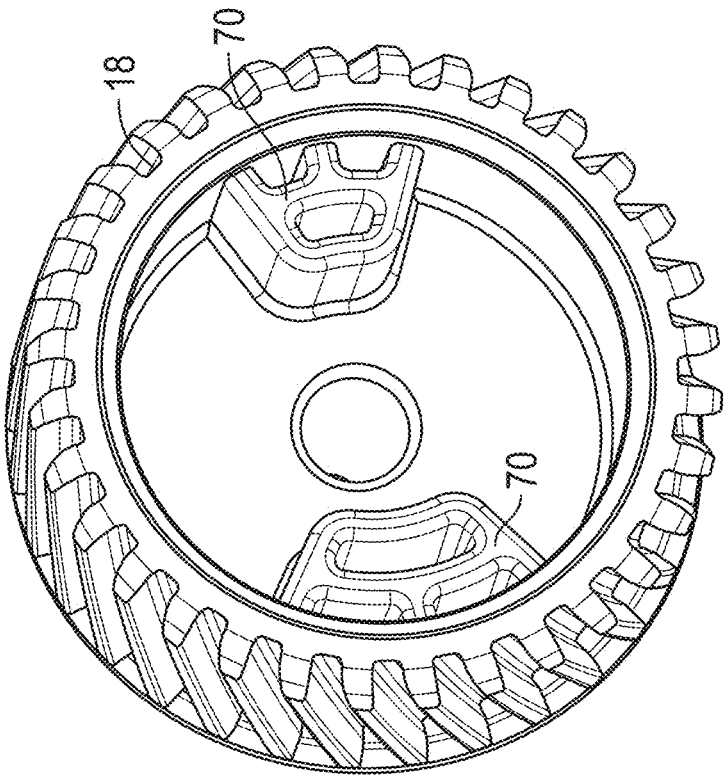


FIG. 2B

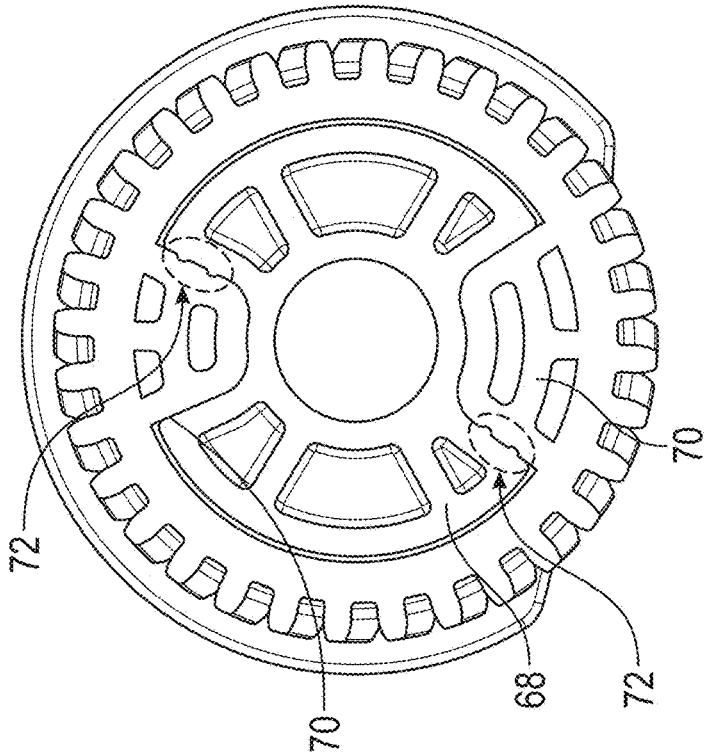


FIG. 2D'

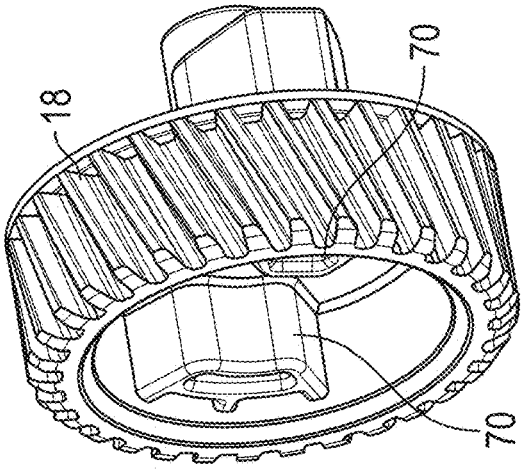
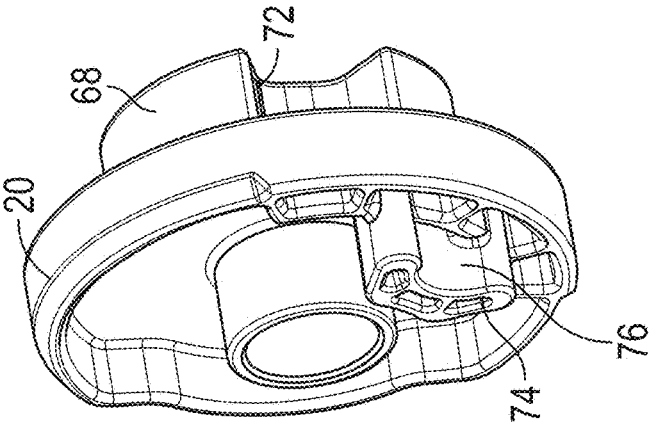


FIG. 2D



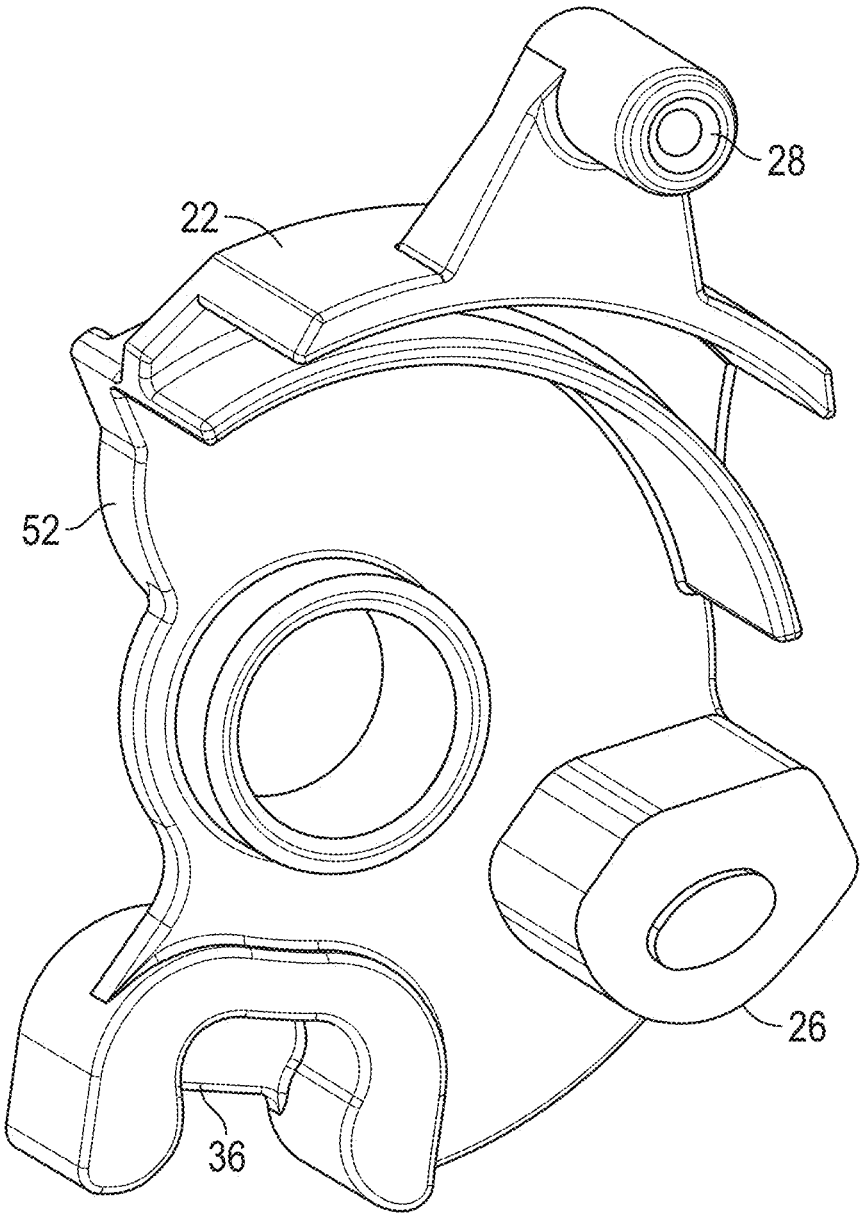


FIG. 2E

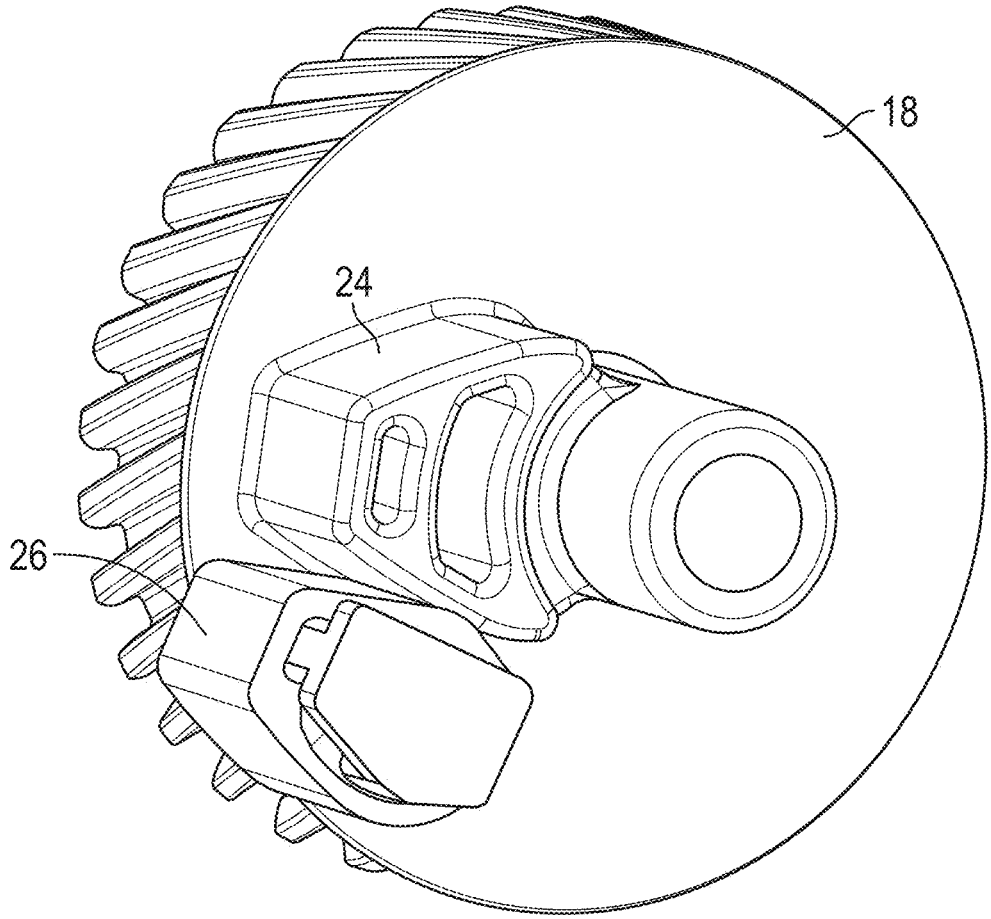


FIG. 2F

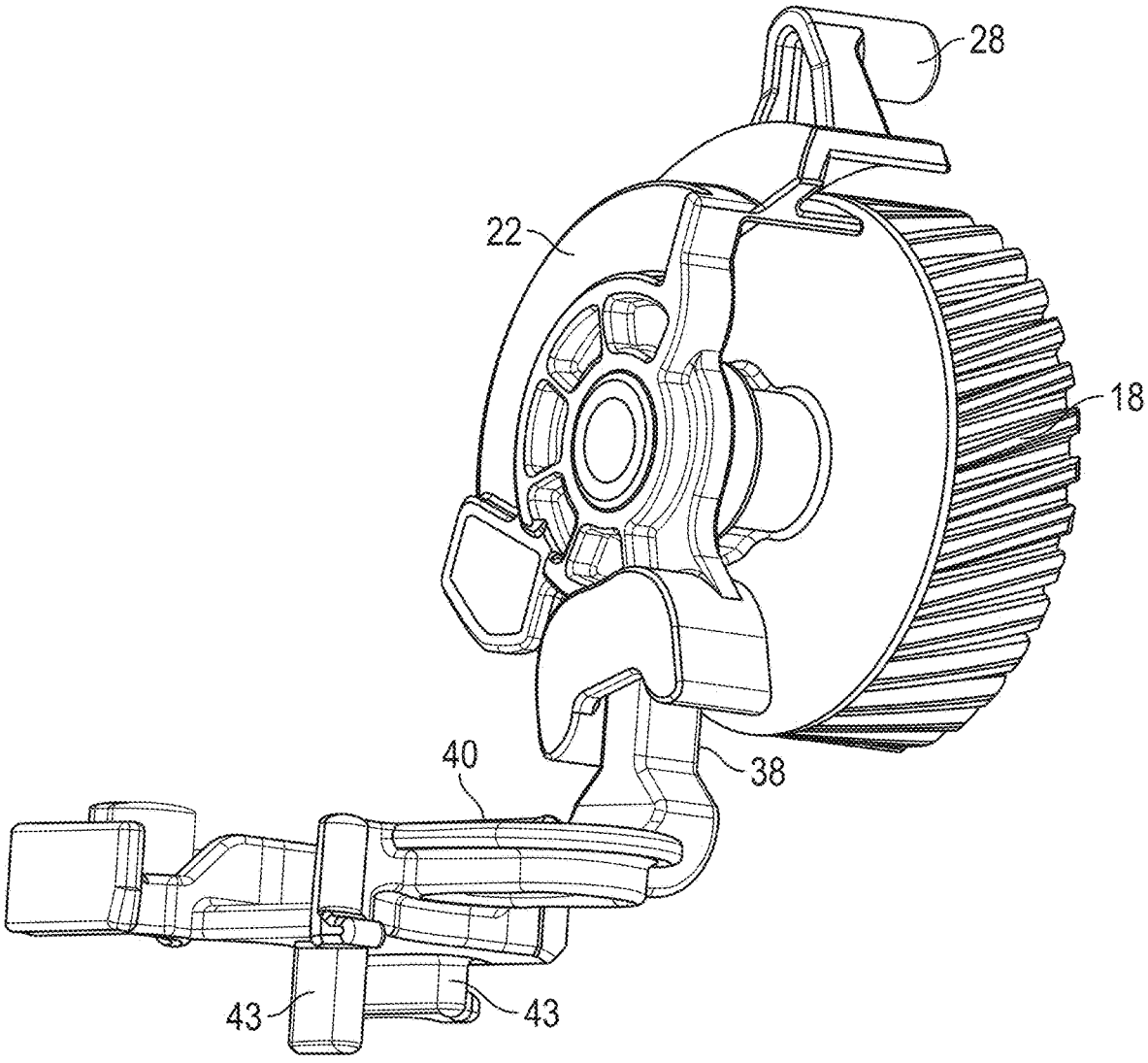


FIG. 3

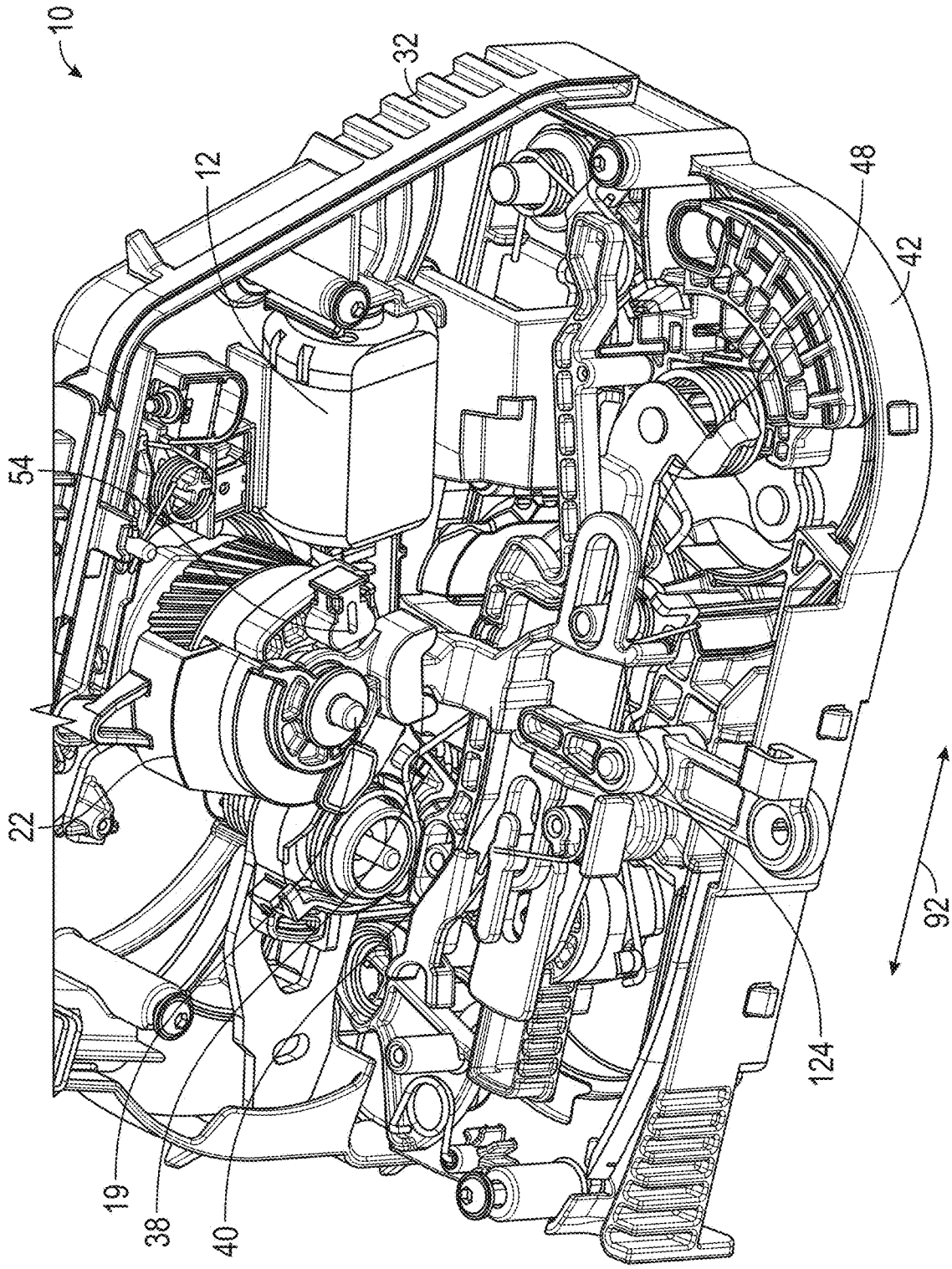


FIG. 4

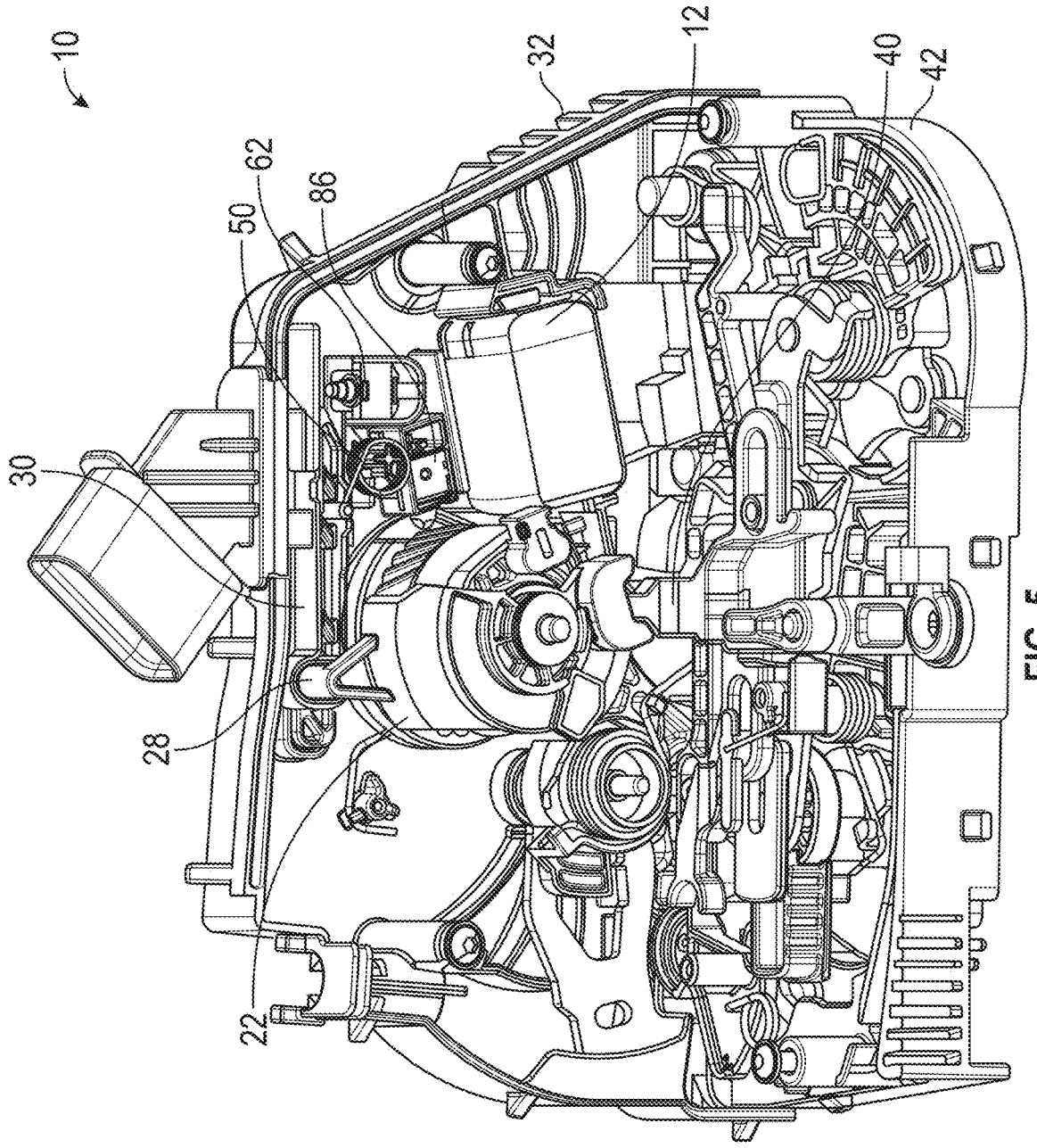


FIG. 5

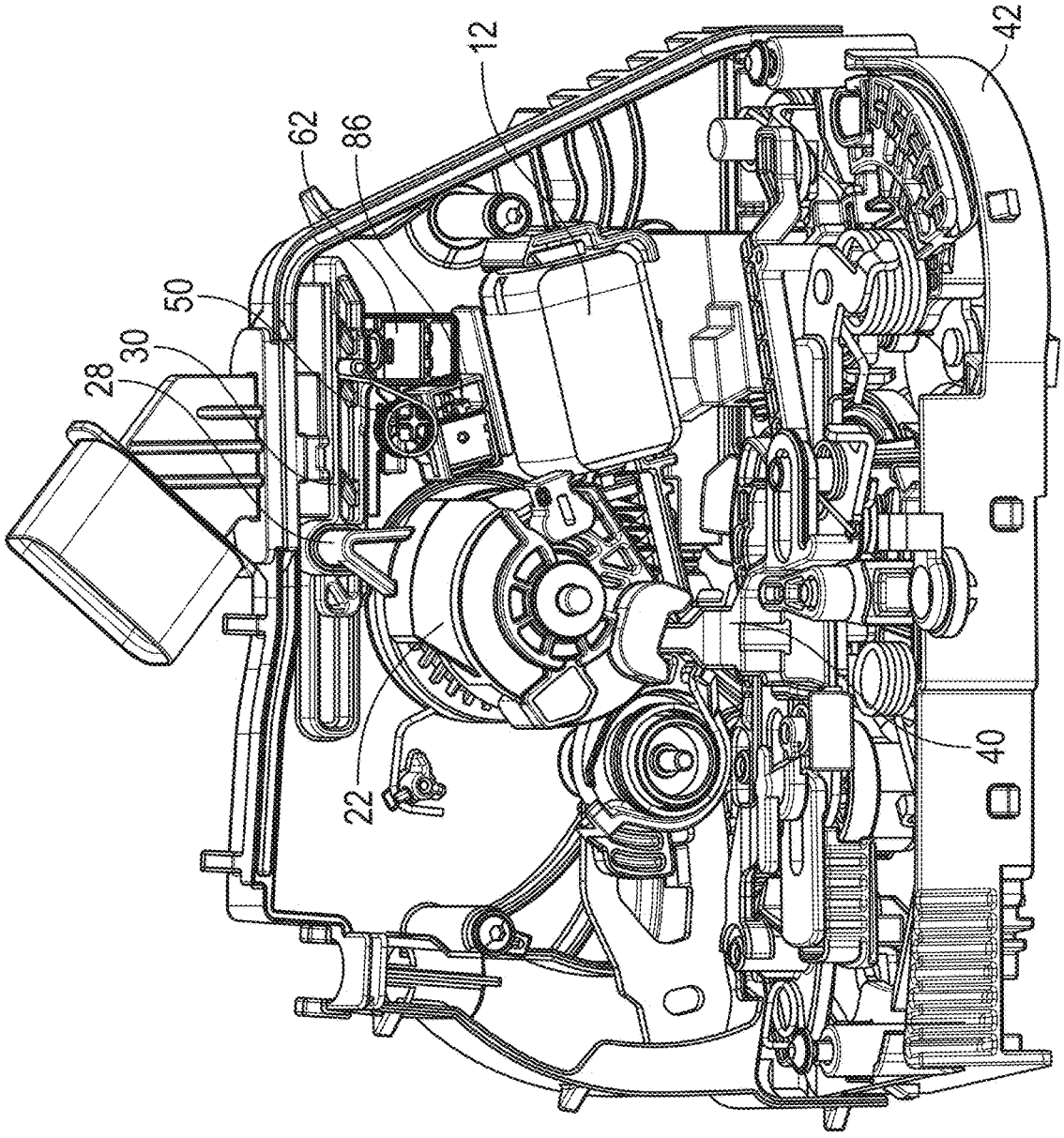


FIG. 6

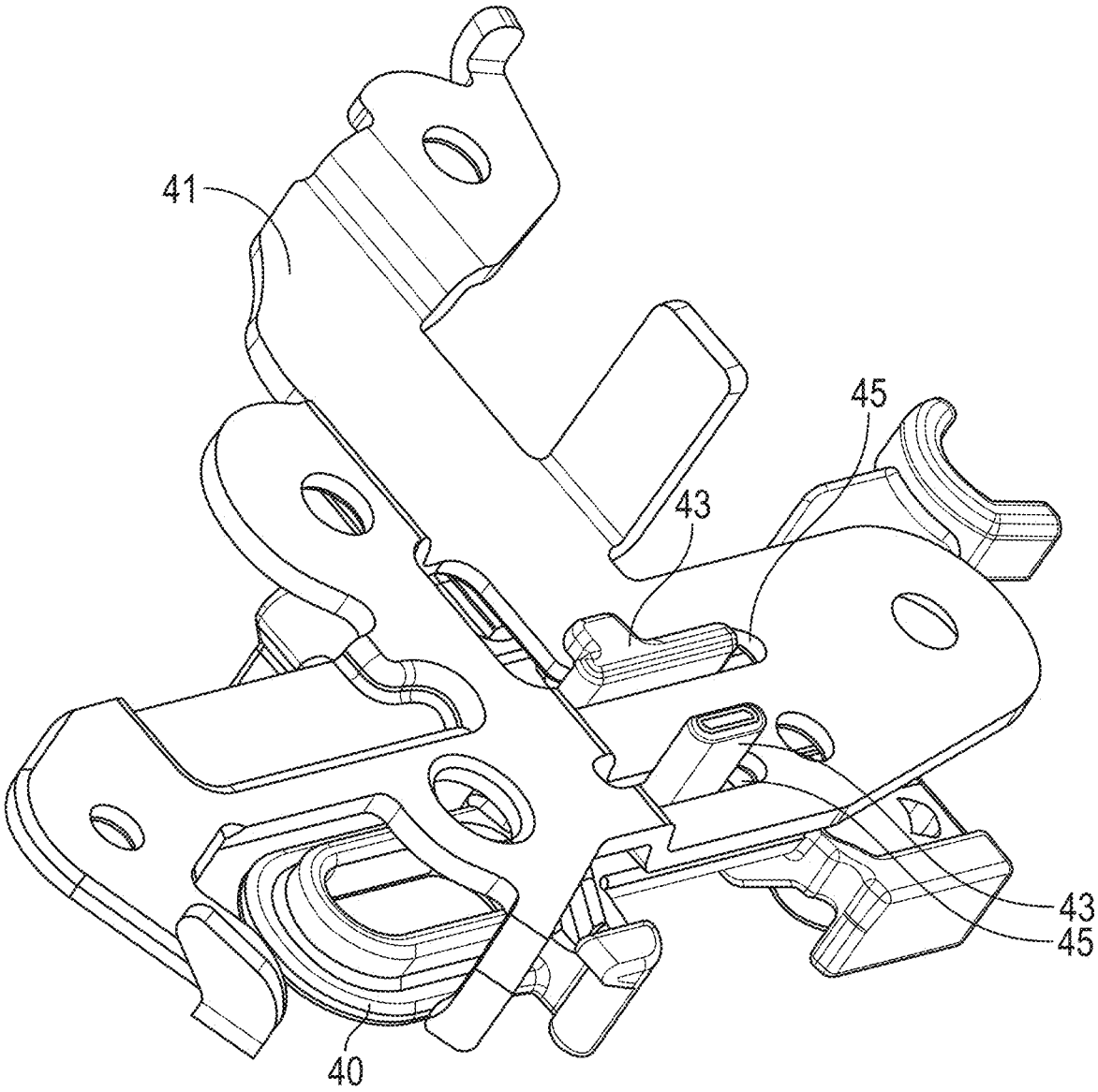


FIG. 7

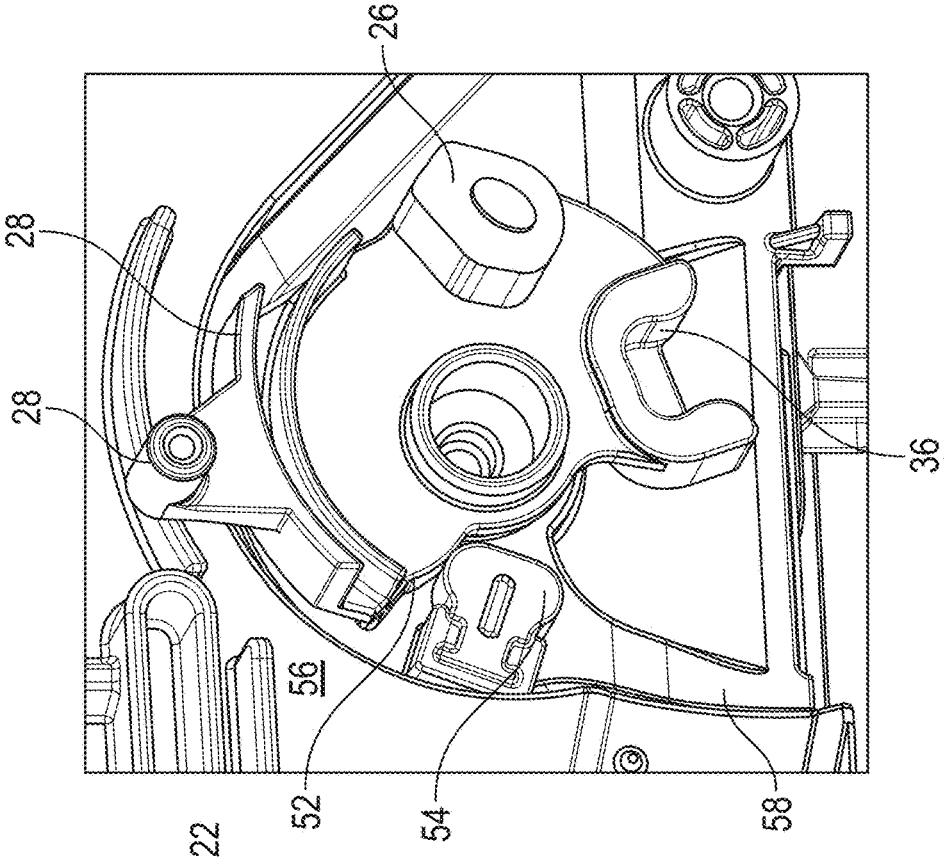


FIG. 9

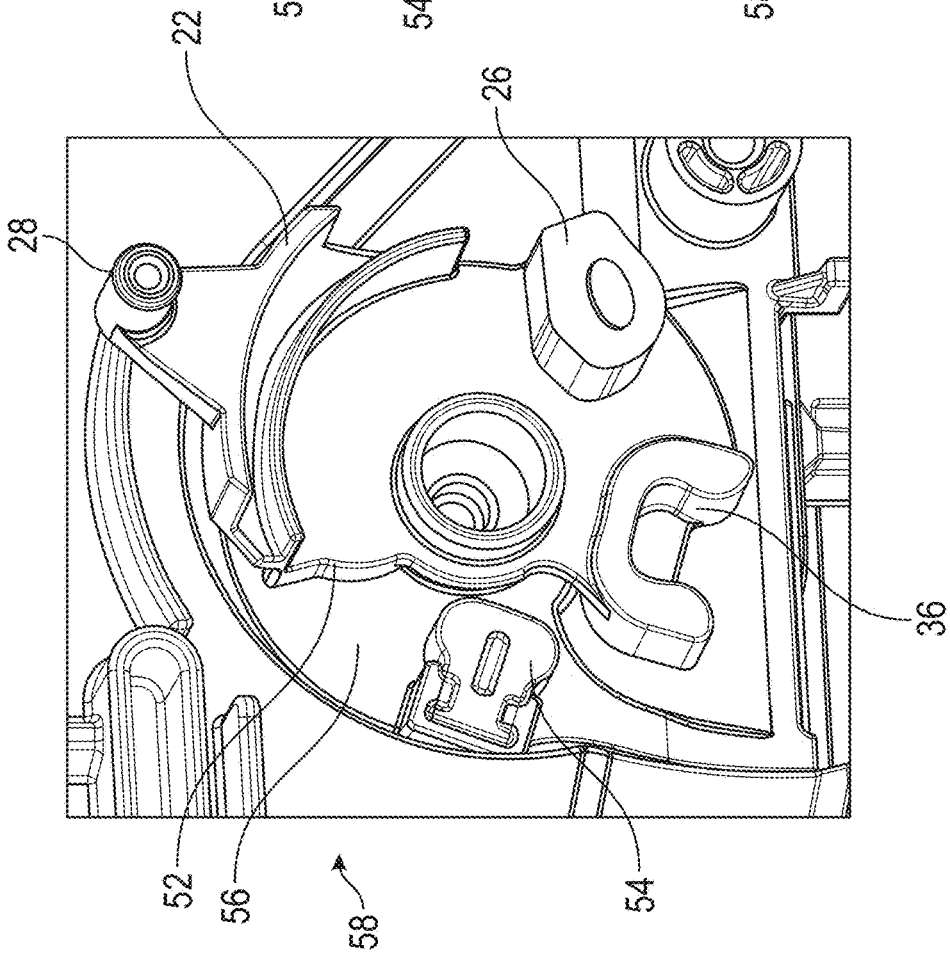


FIG. 8

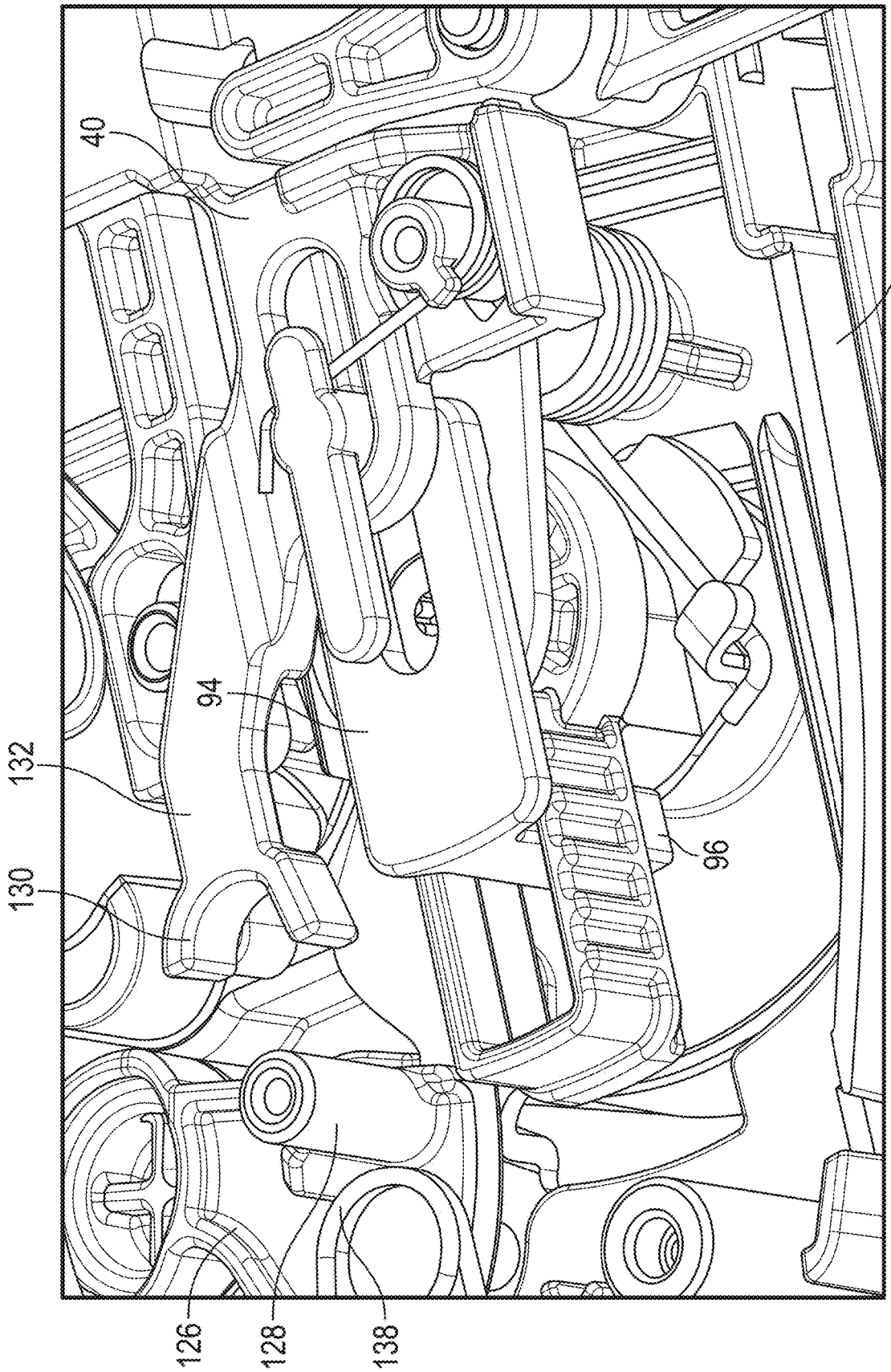


FIG. 10

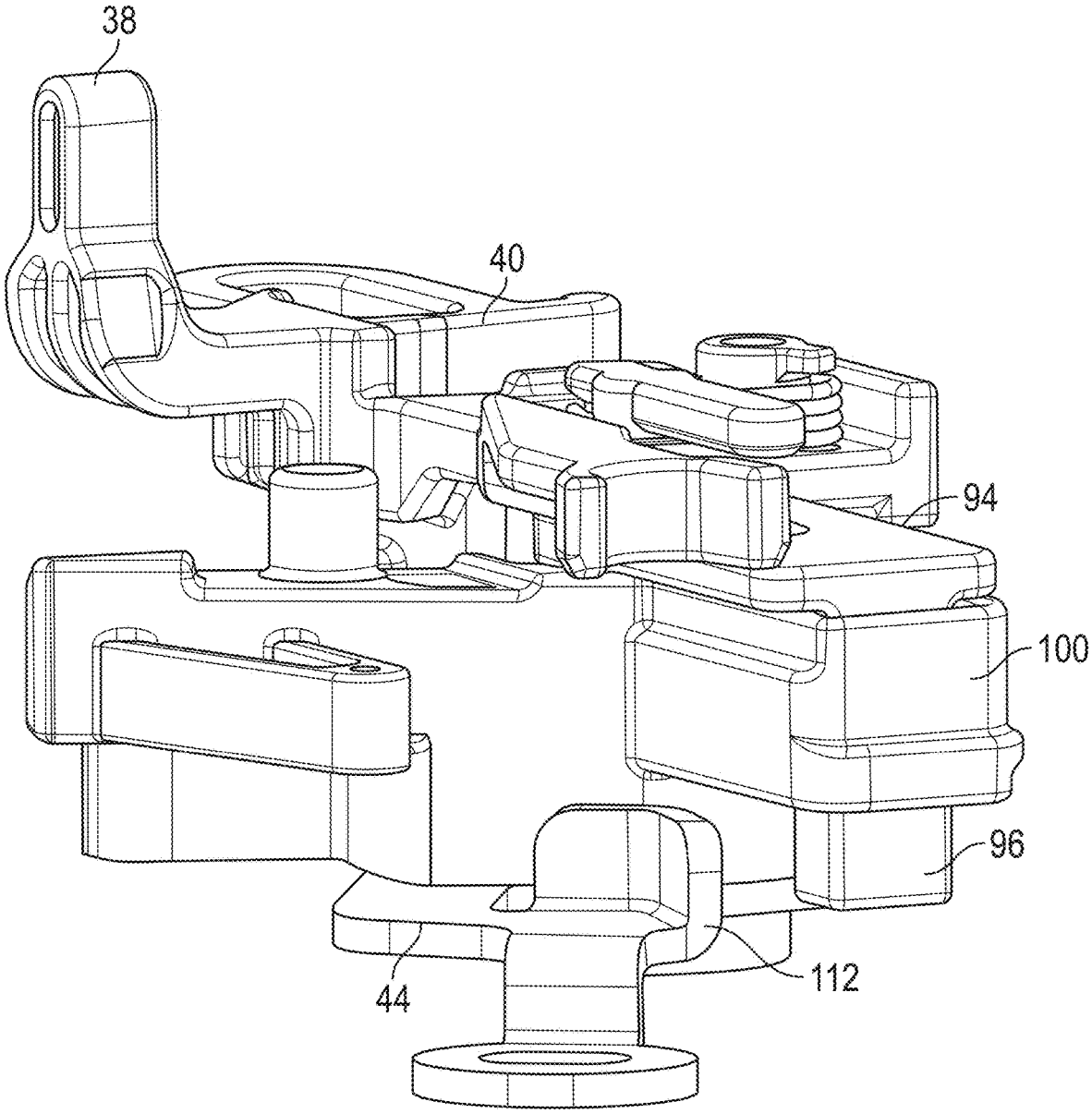


FIG. 11

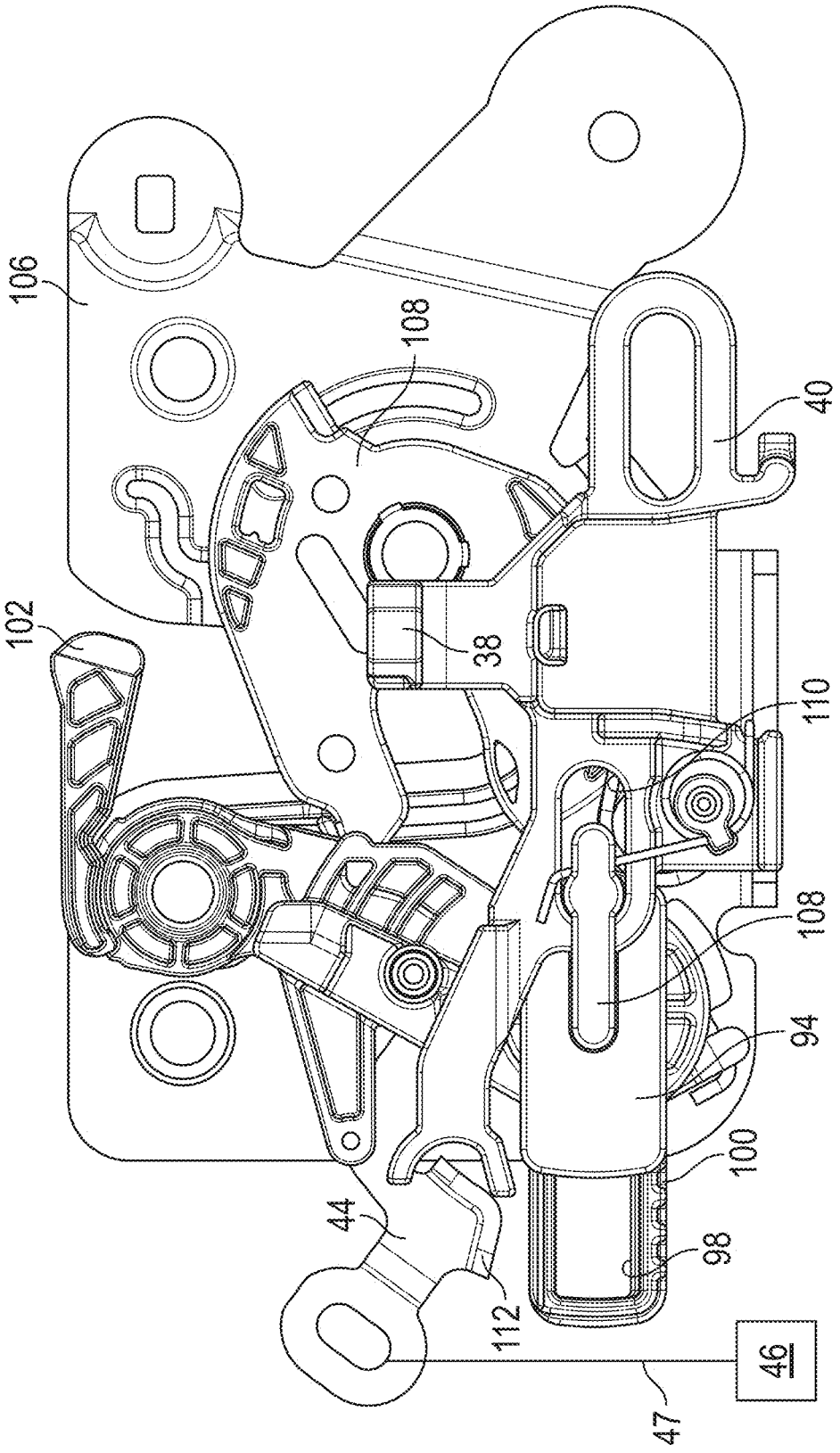


FIG. 12A

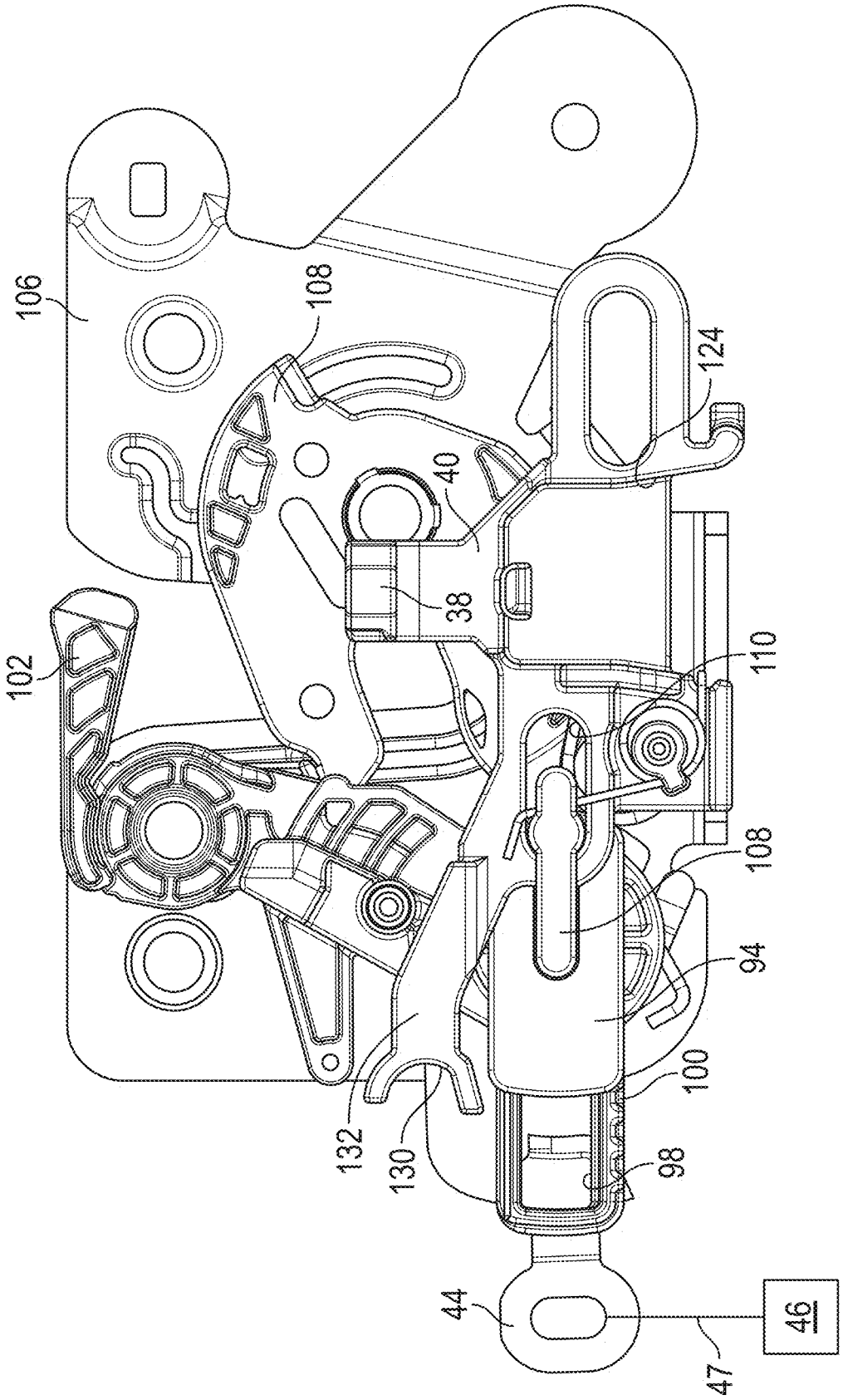


FIG. 12B

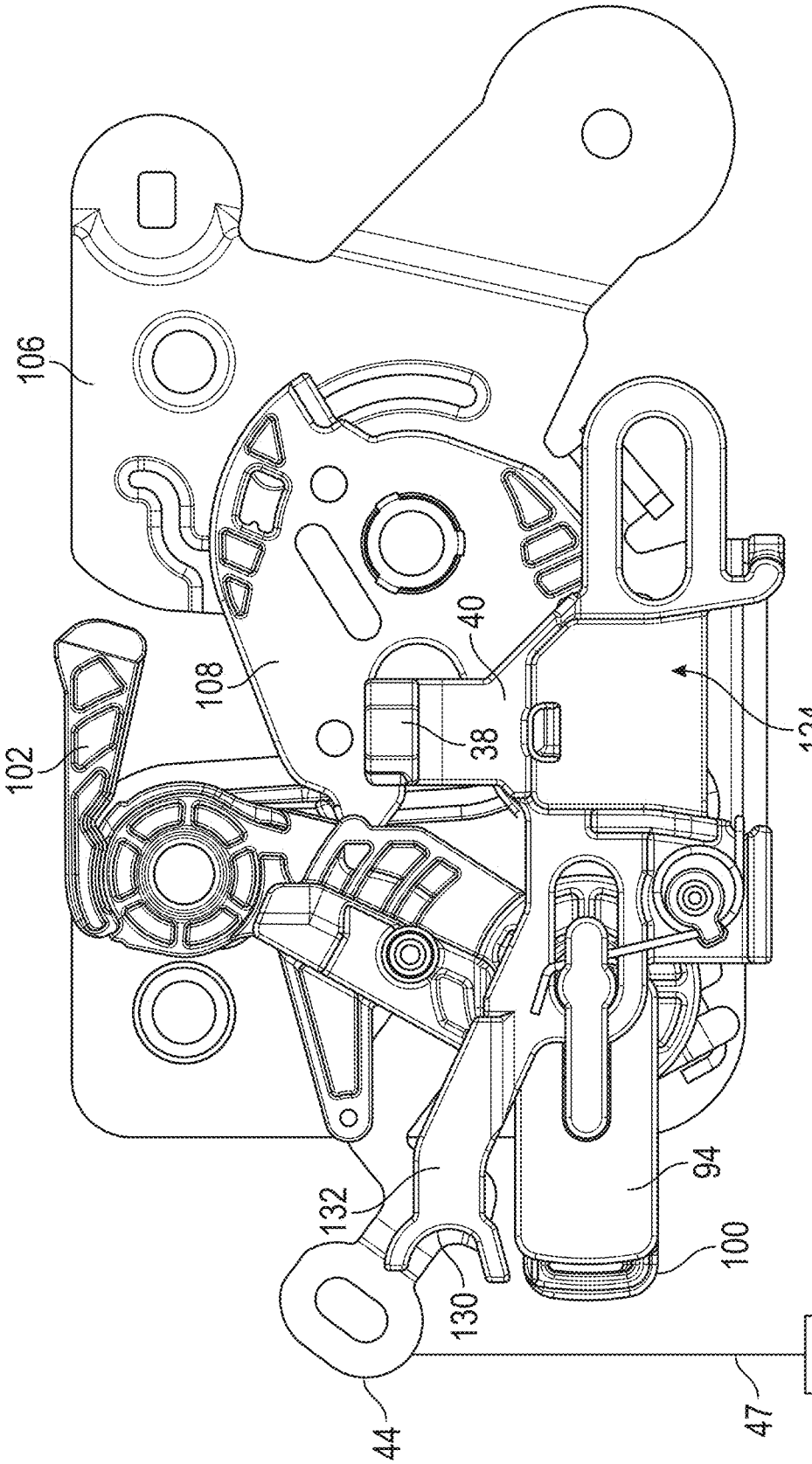


FIG. 13A

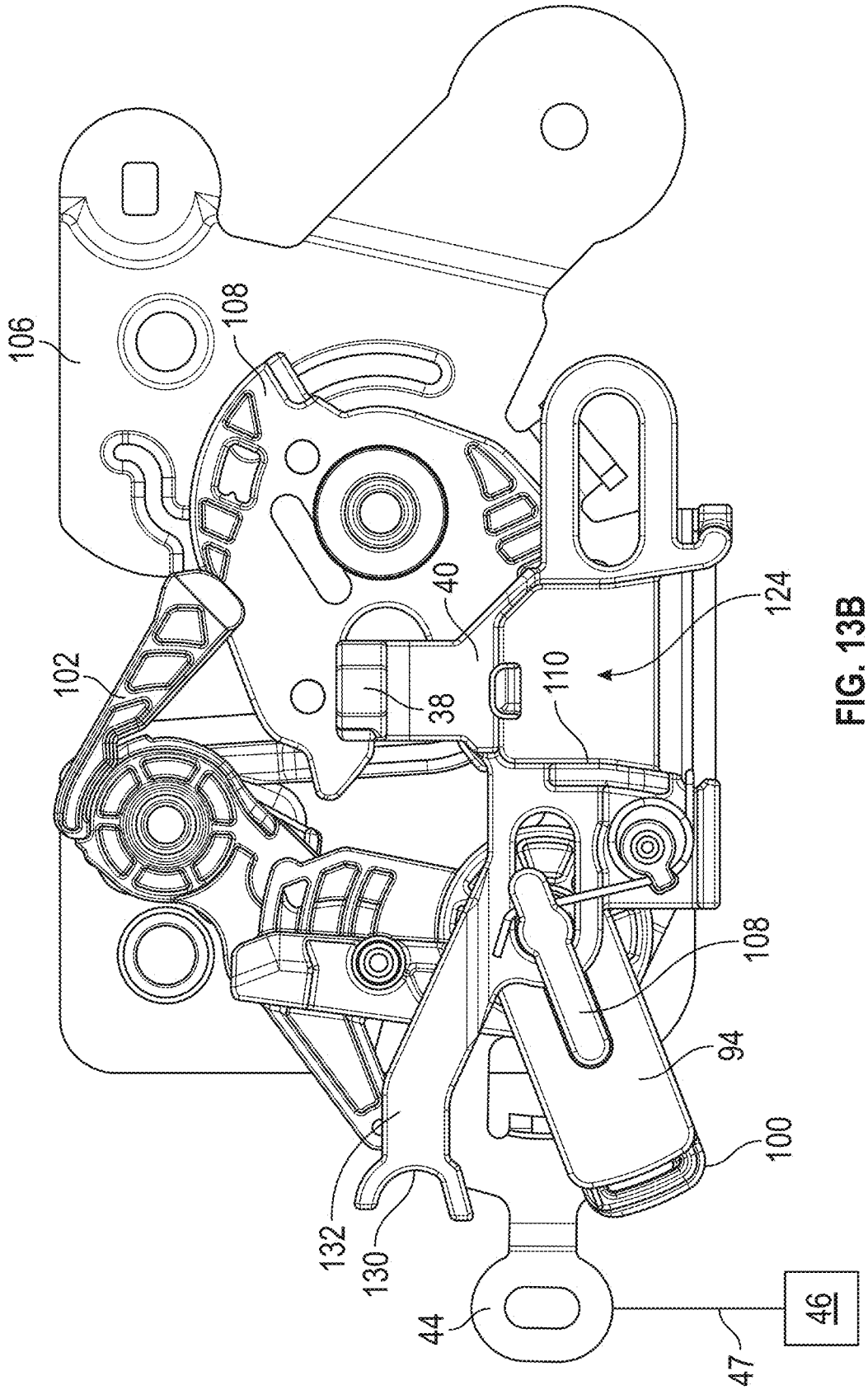


FIG. 13B

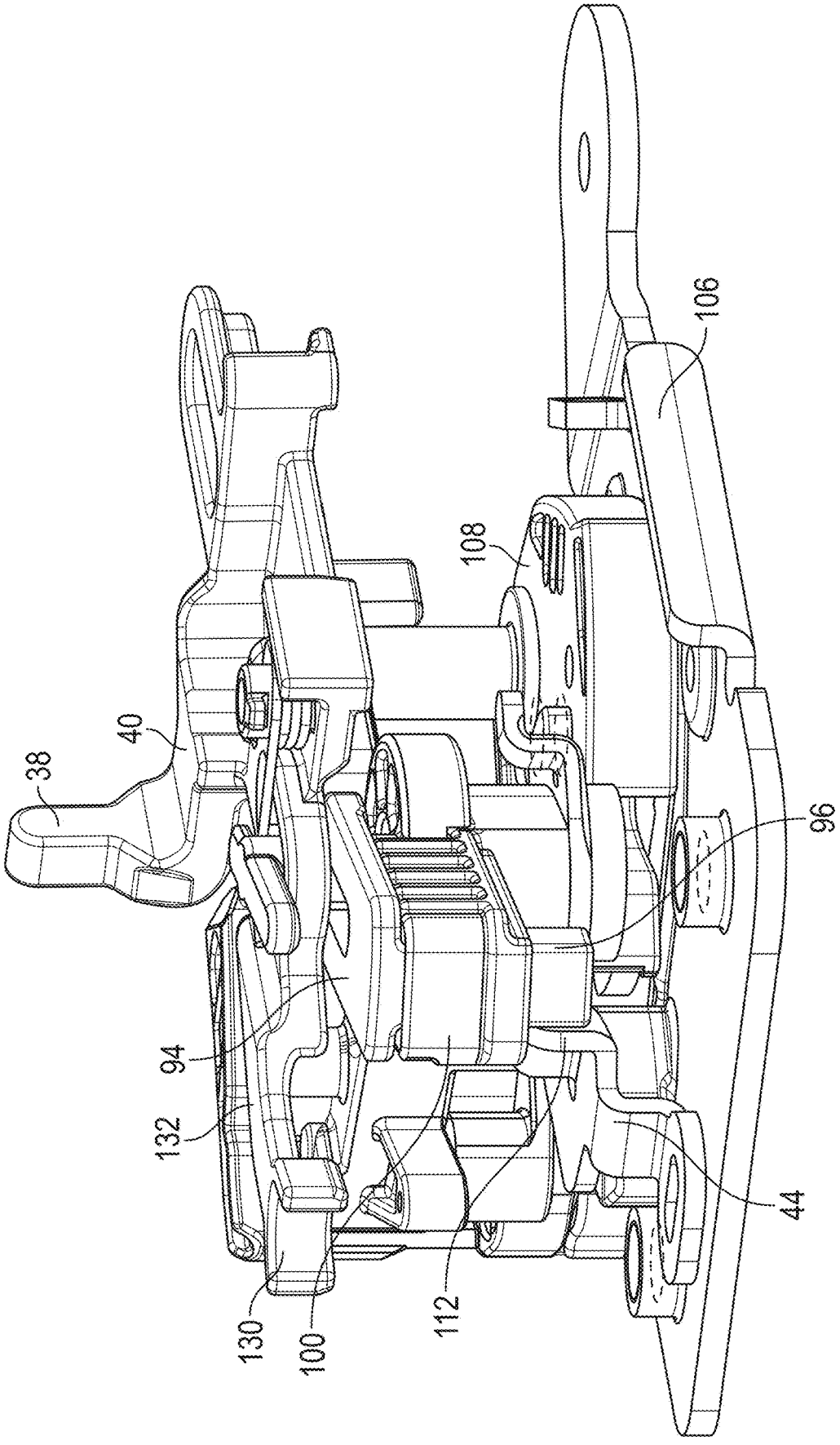


FIG. 13C

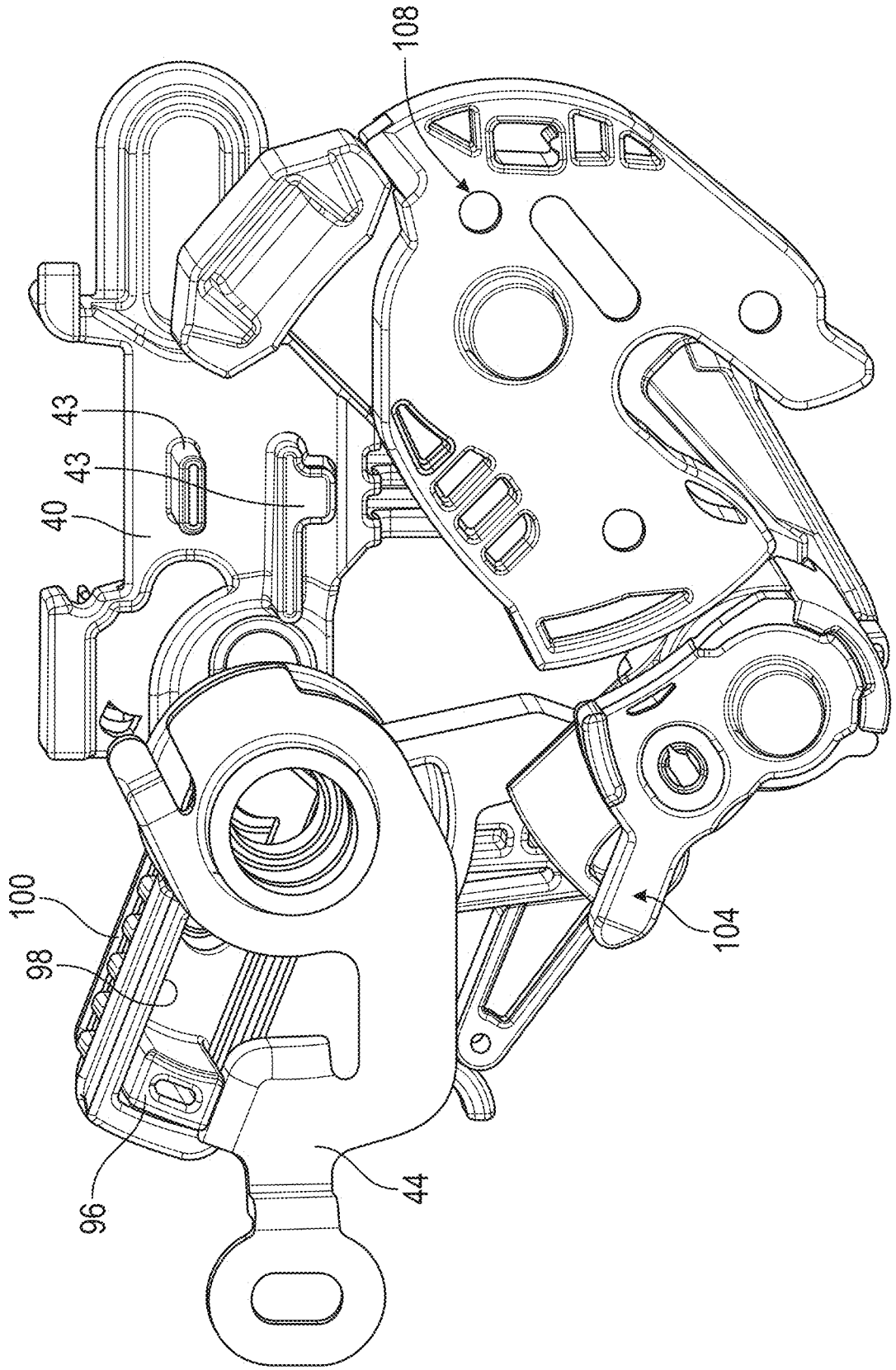


FIG. 14

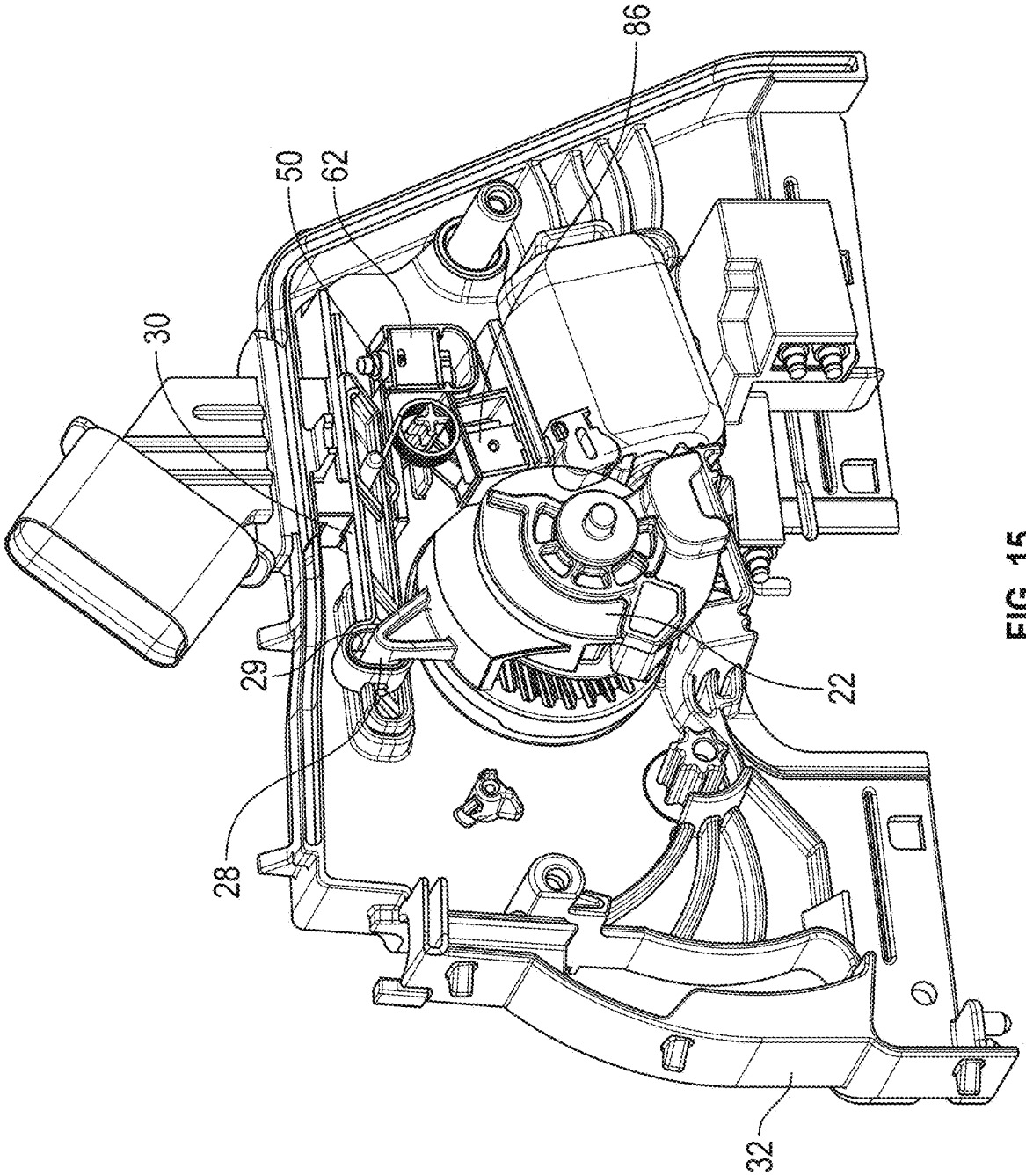


FIG. 15

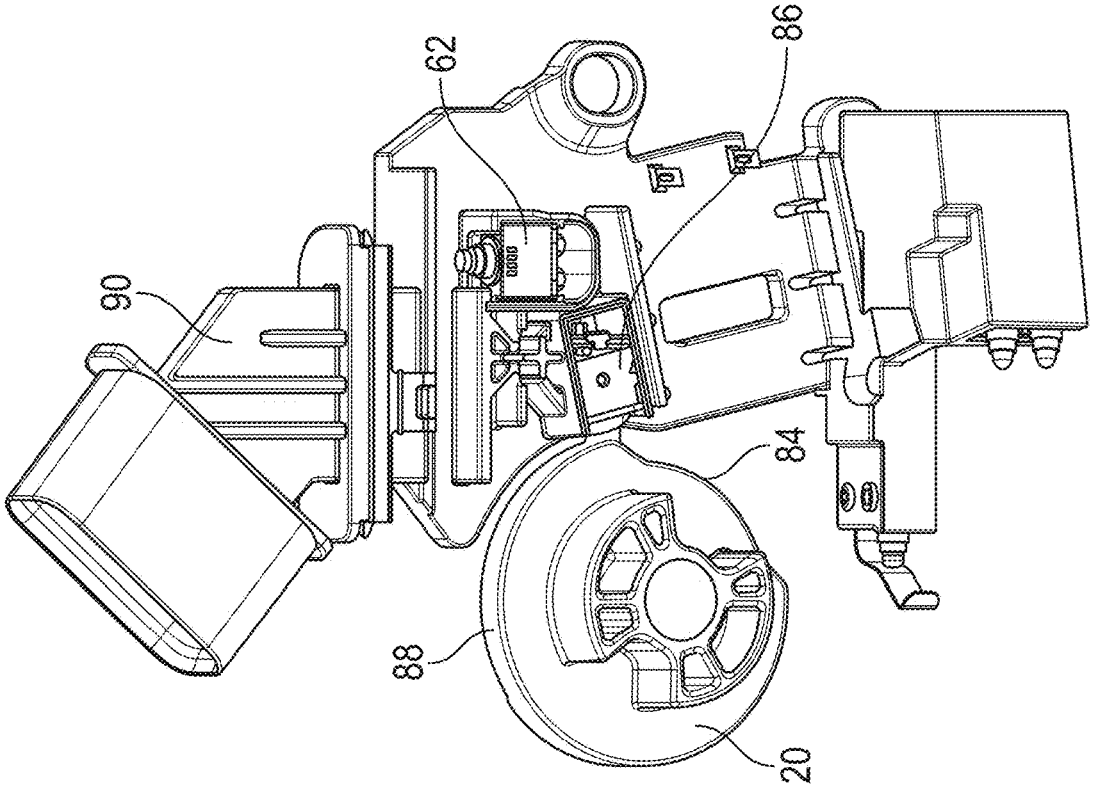


FIG. 17

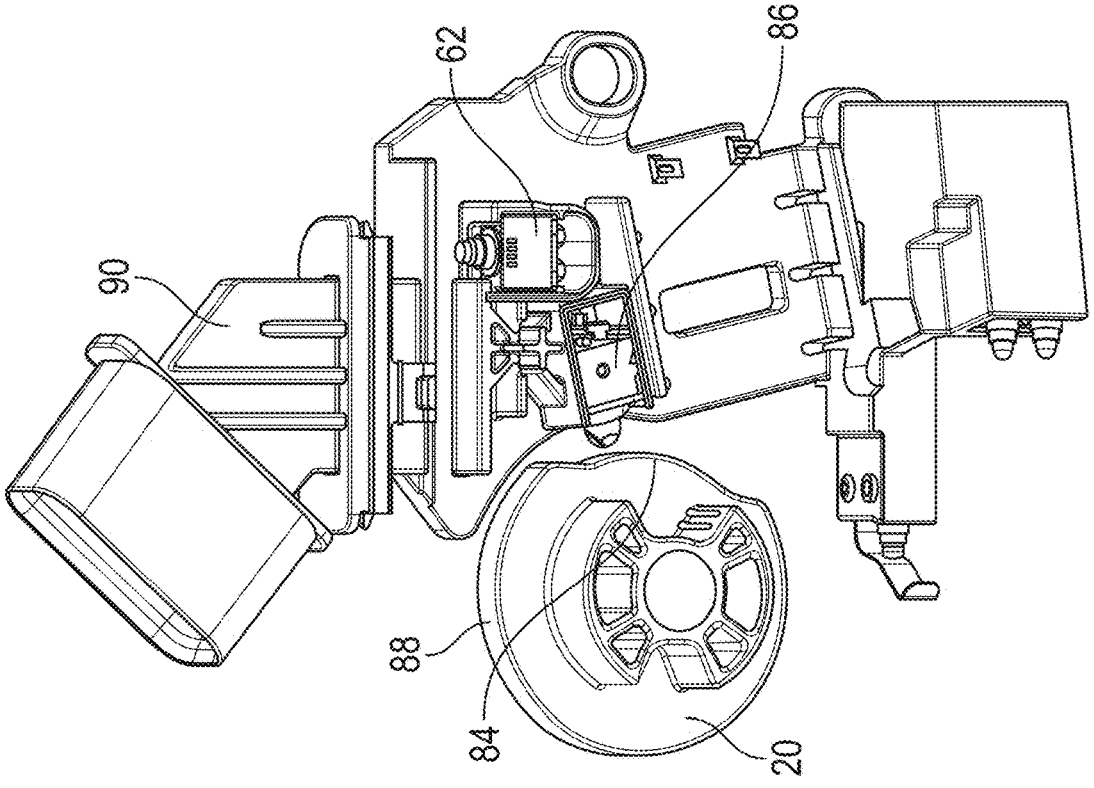


FIG. 16

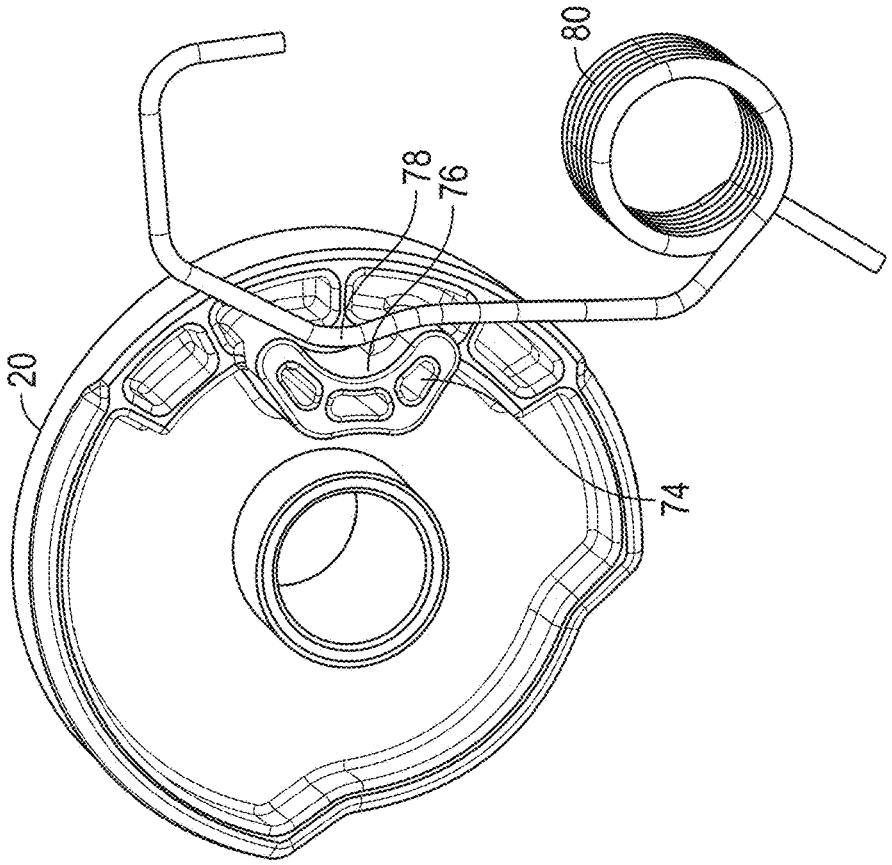


FIG. 19

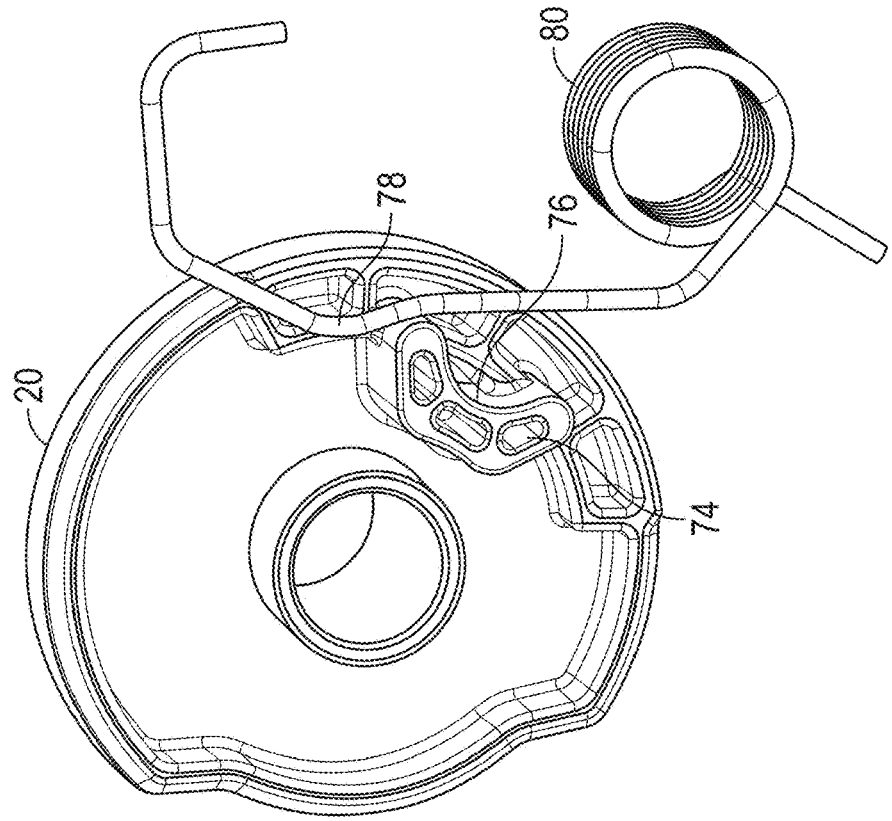


FIG. 18

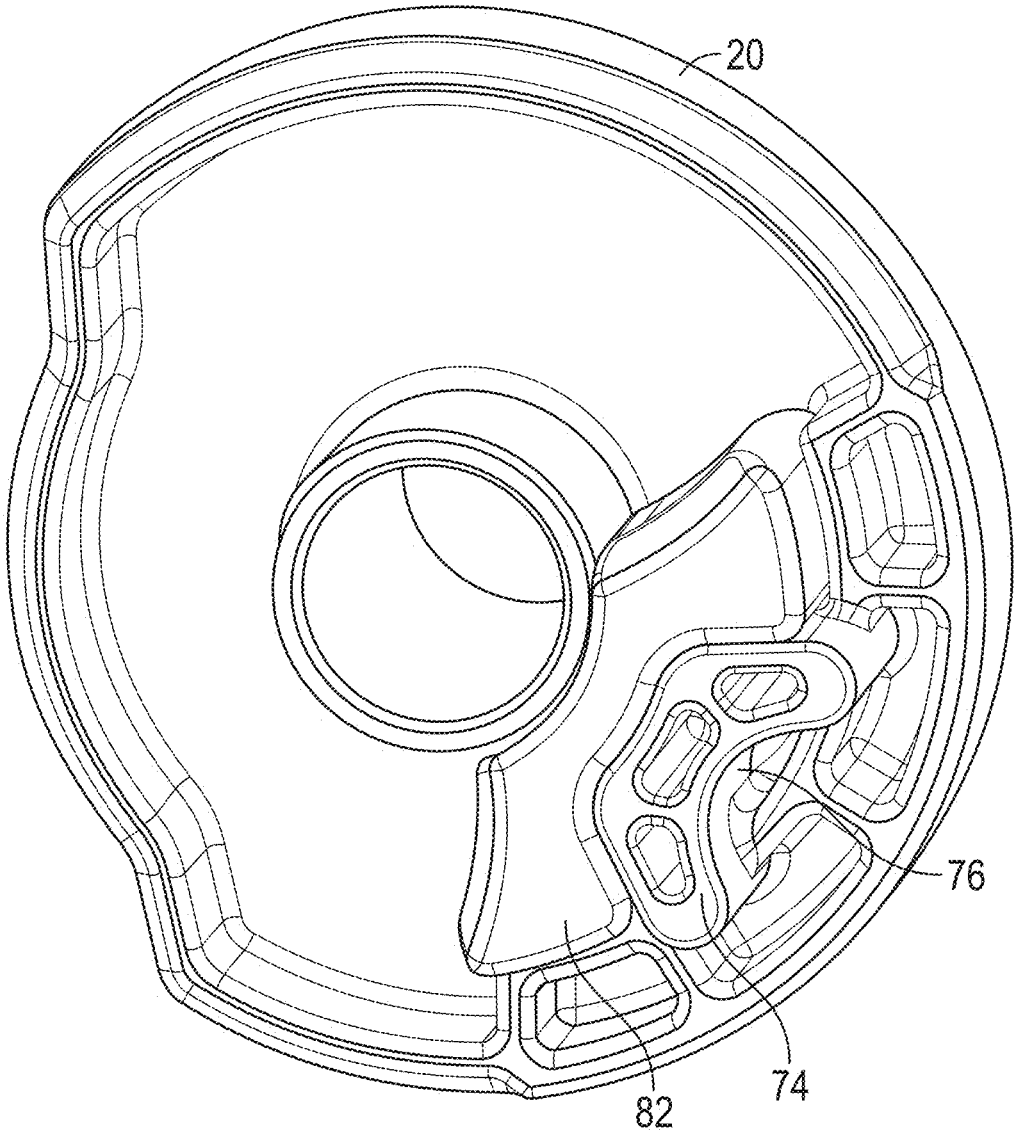


FIG. 20

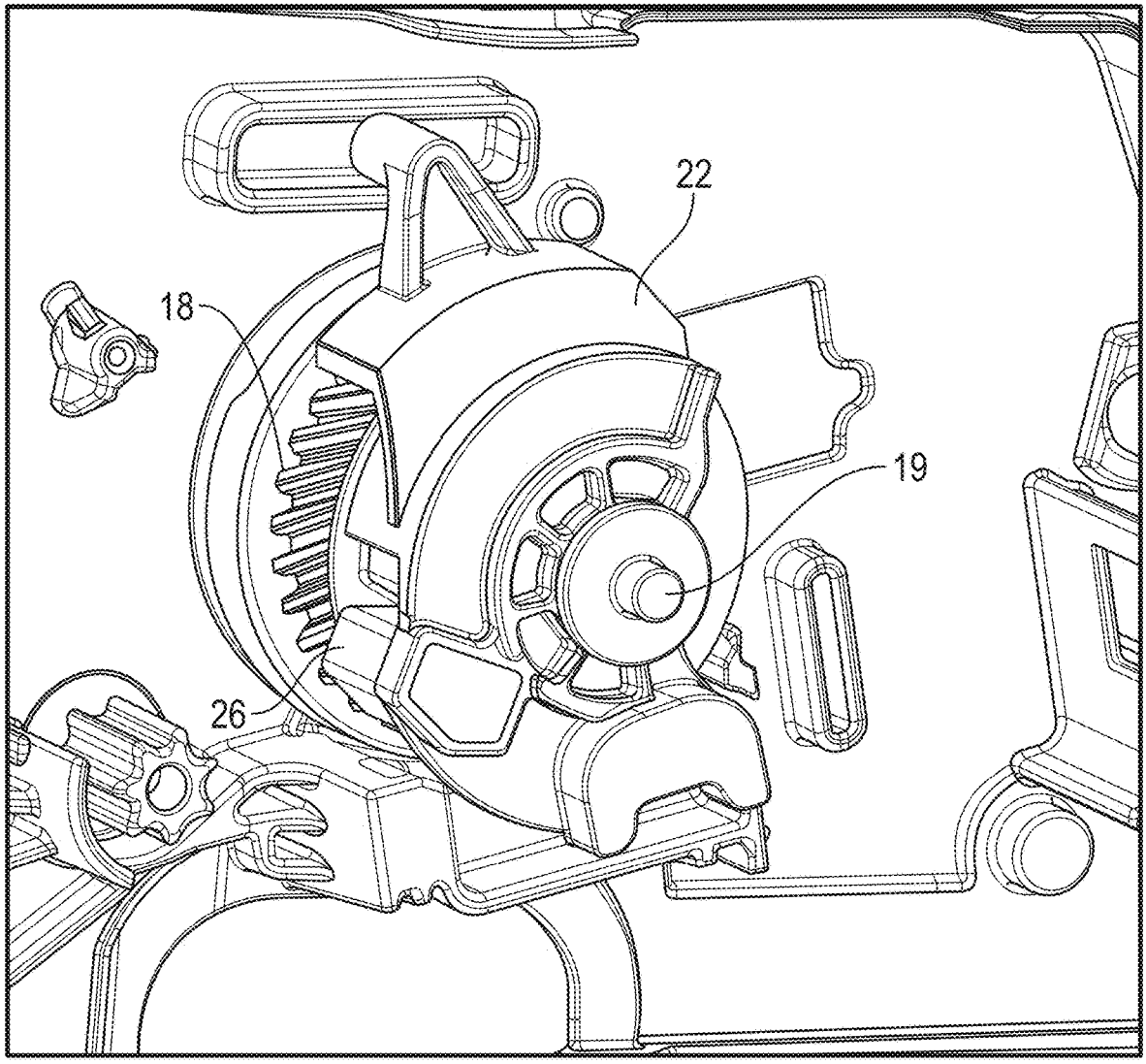


FIG. 21

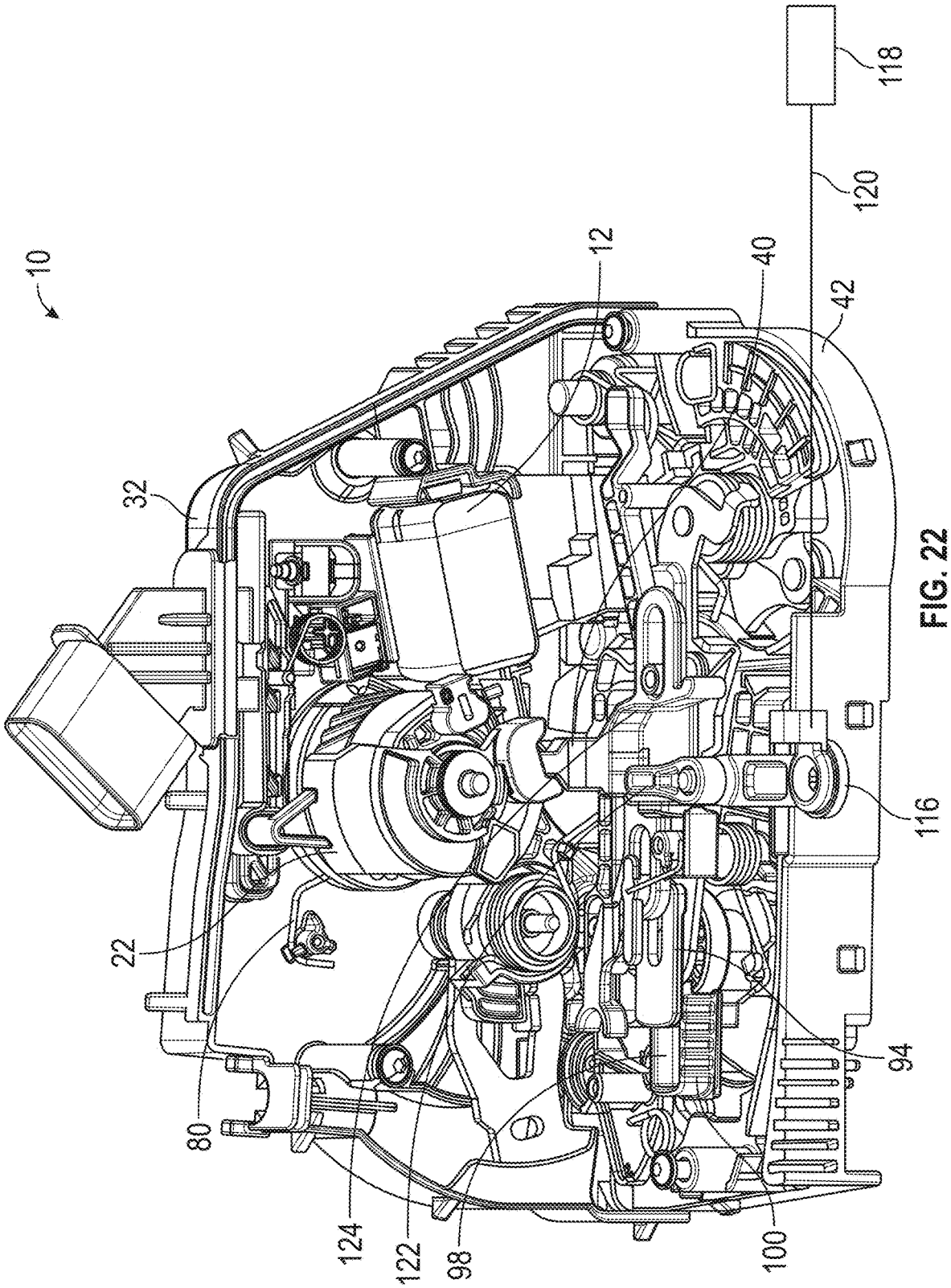


FIG. 22

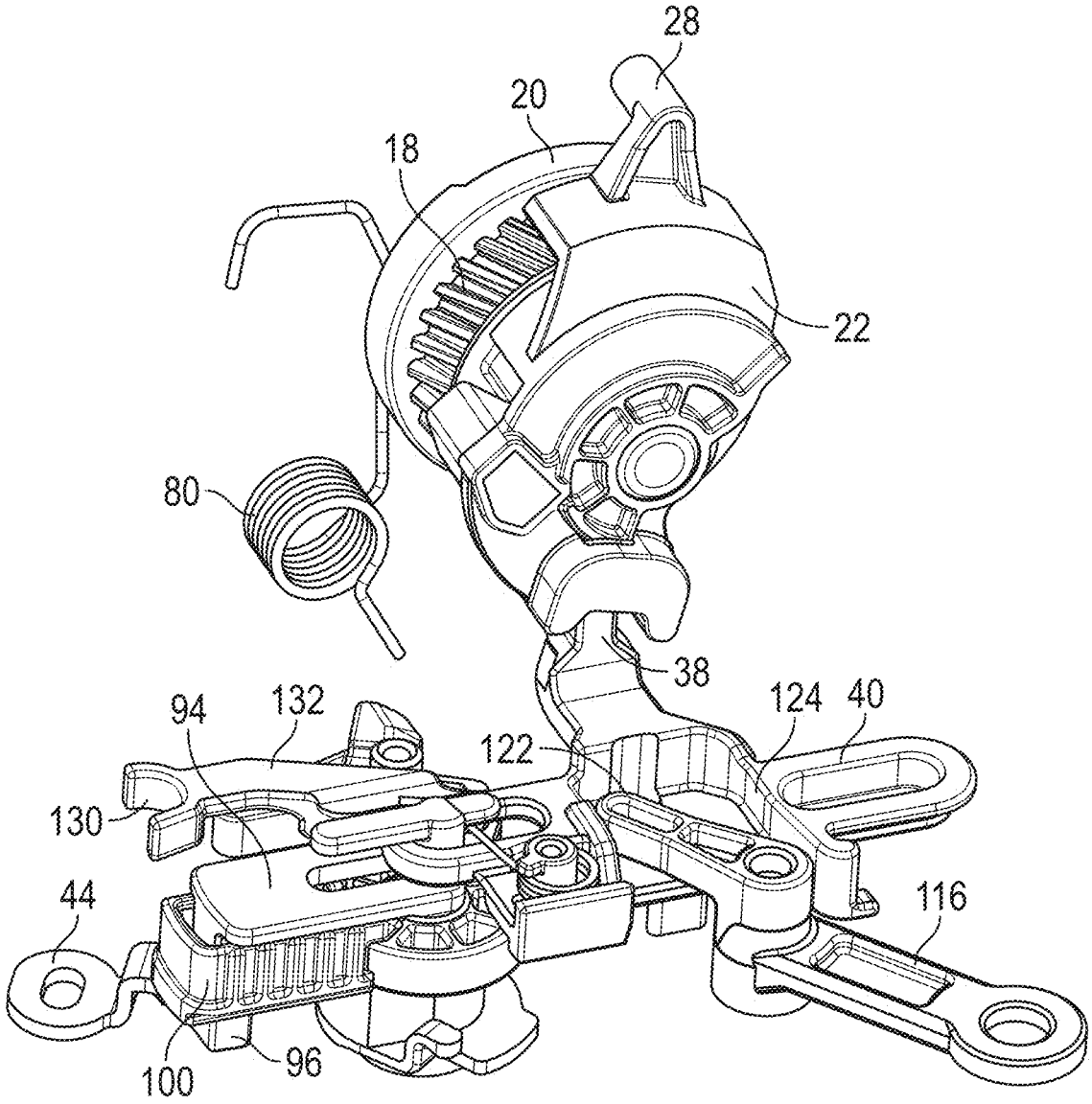


FIG. 23

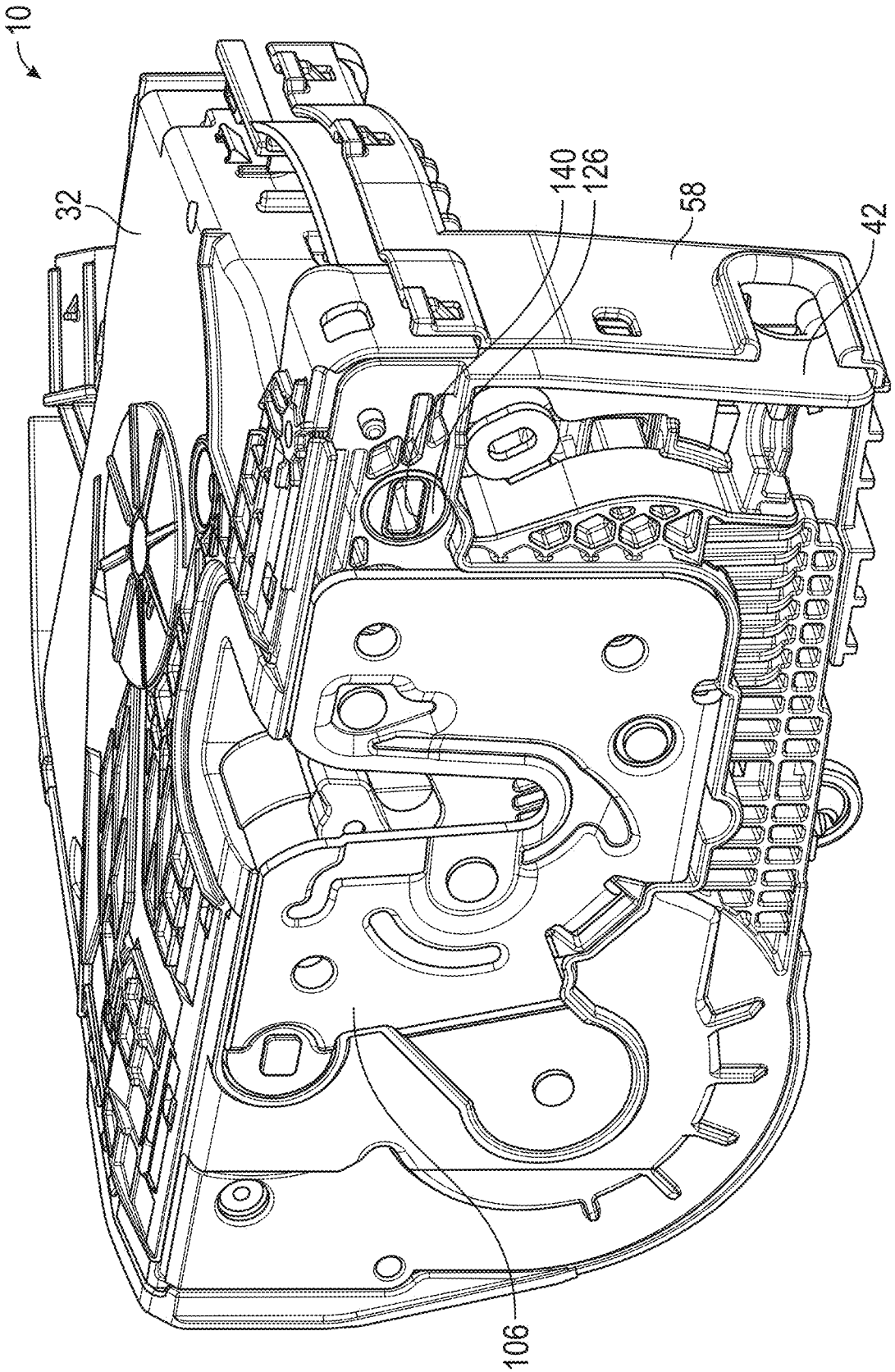


FIG. 24

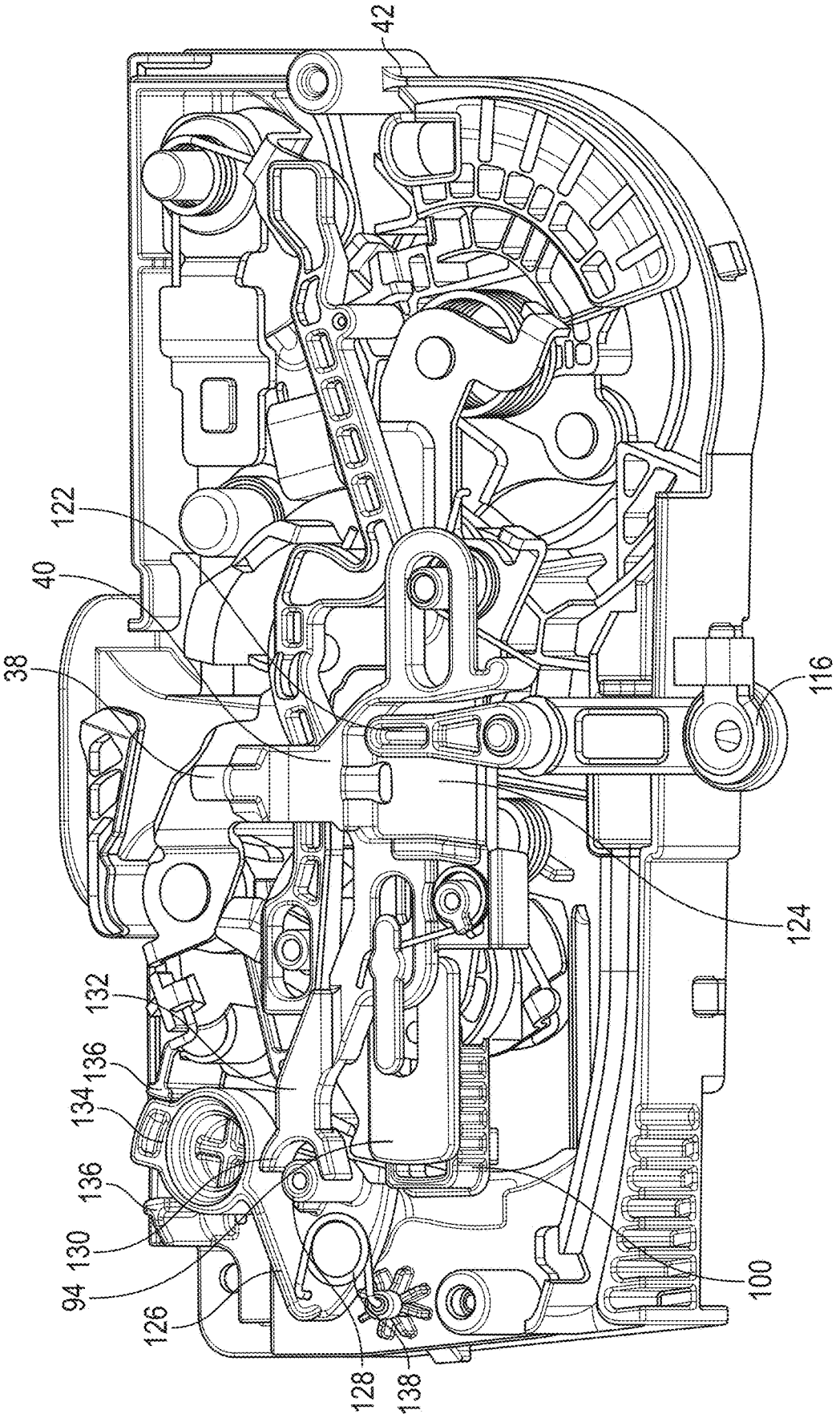


FIG. 25A

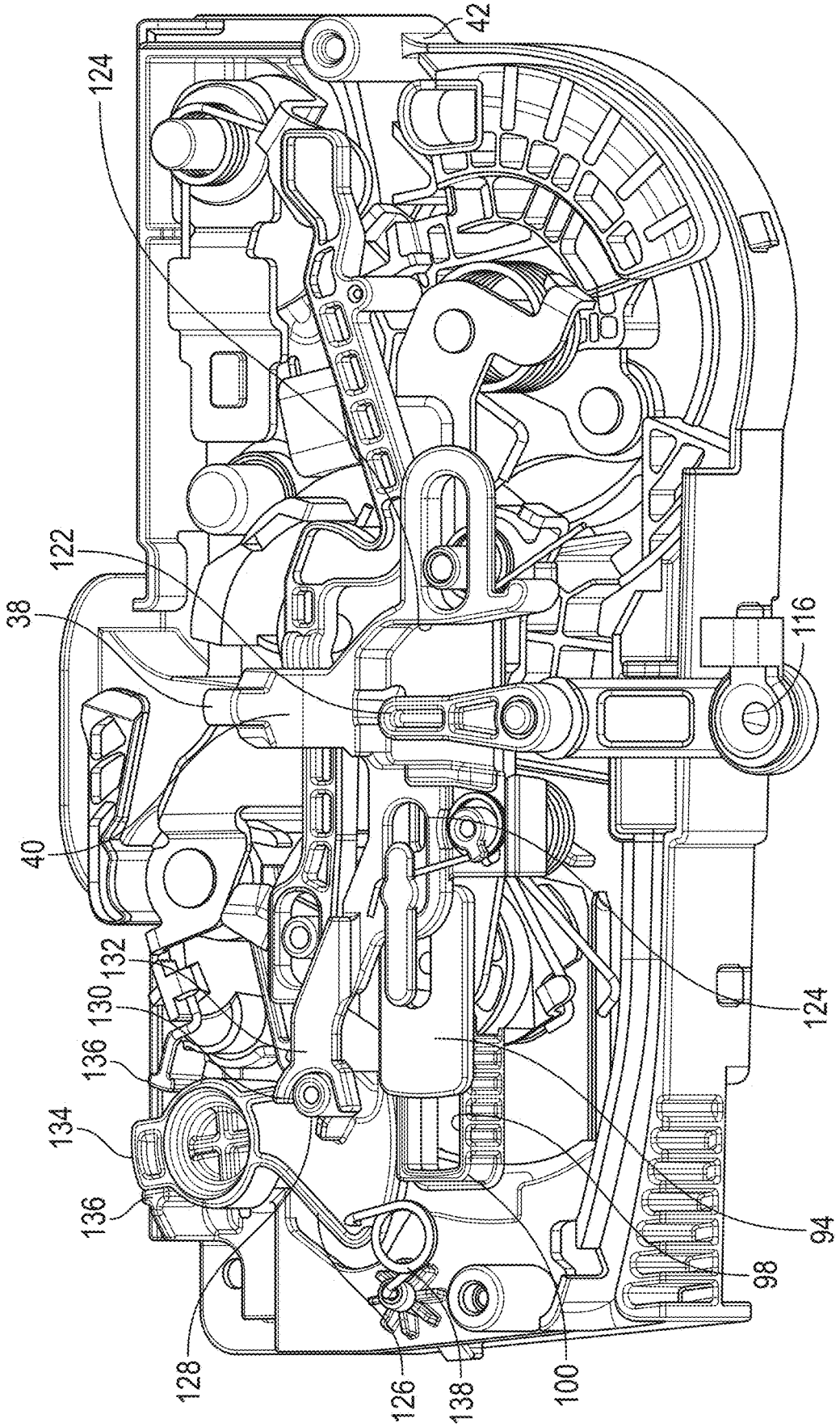


FIG. 25B

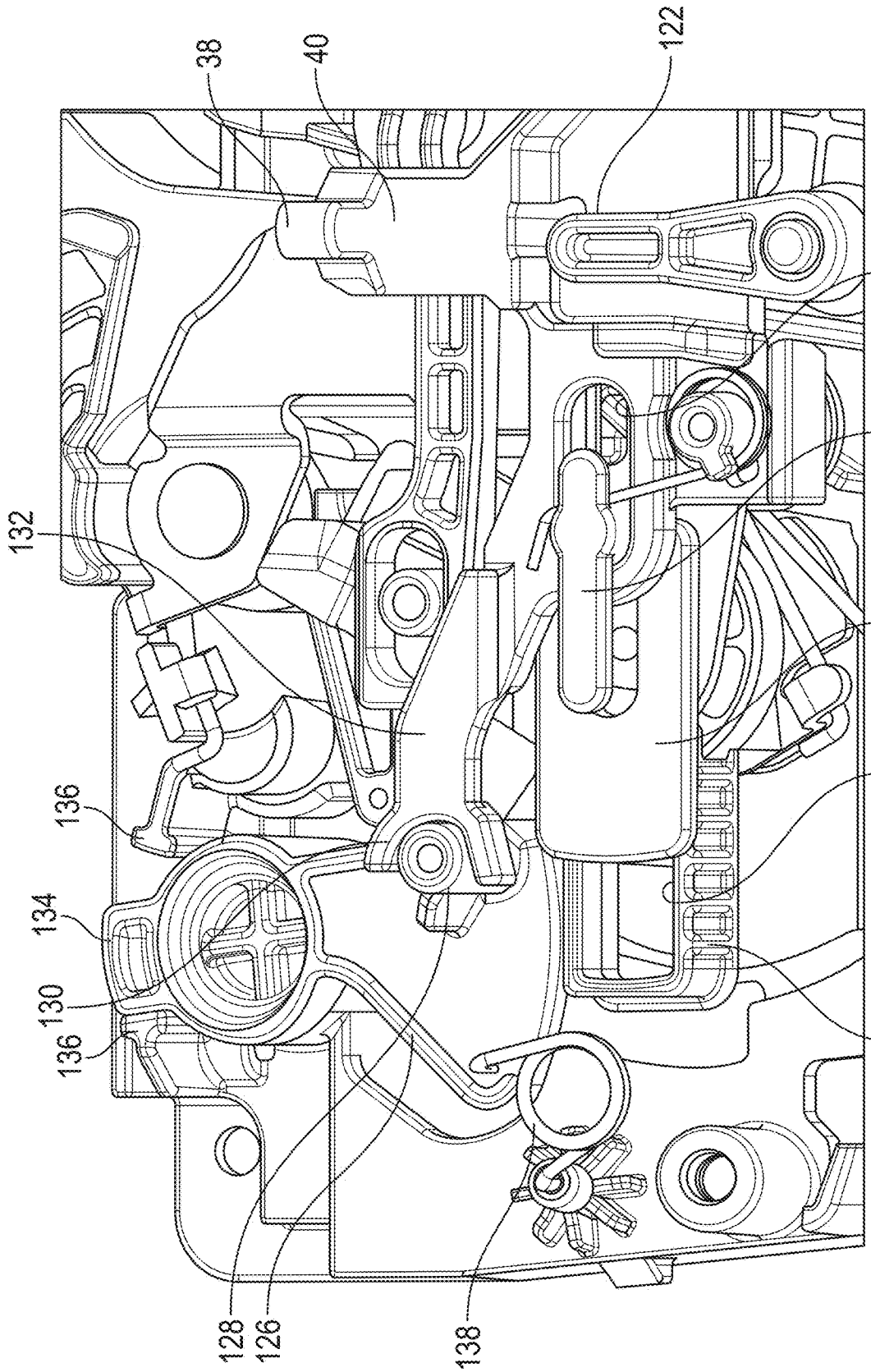


FIG. 26

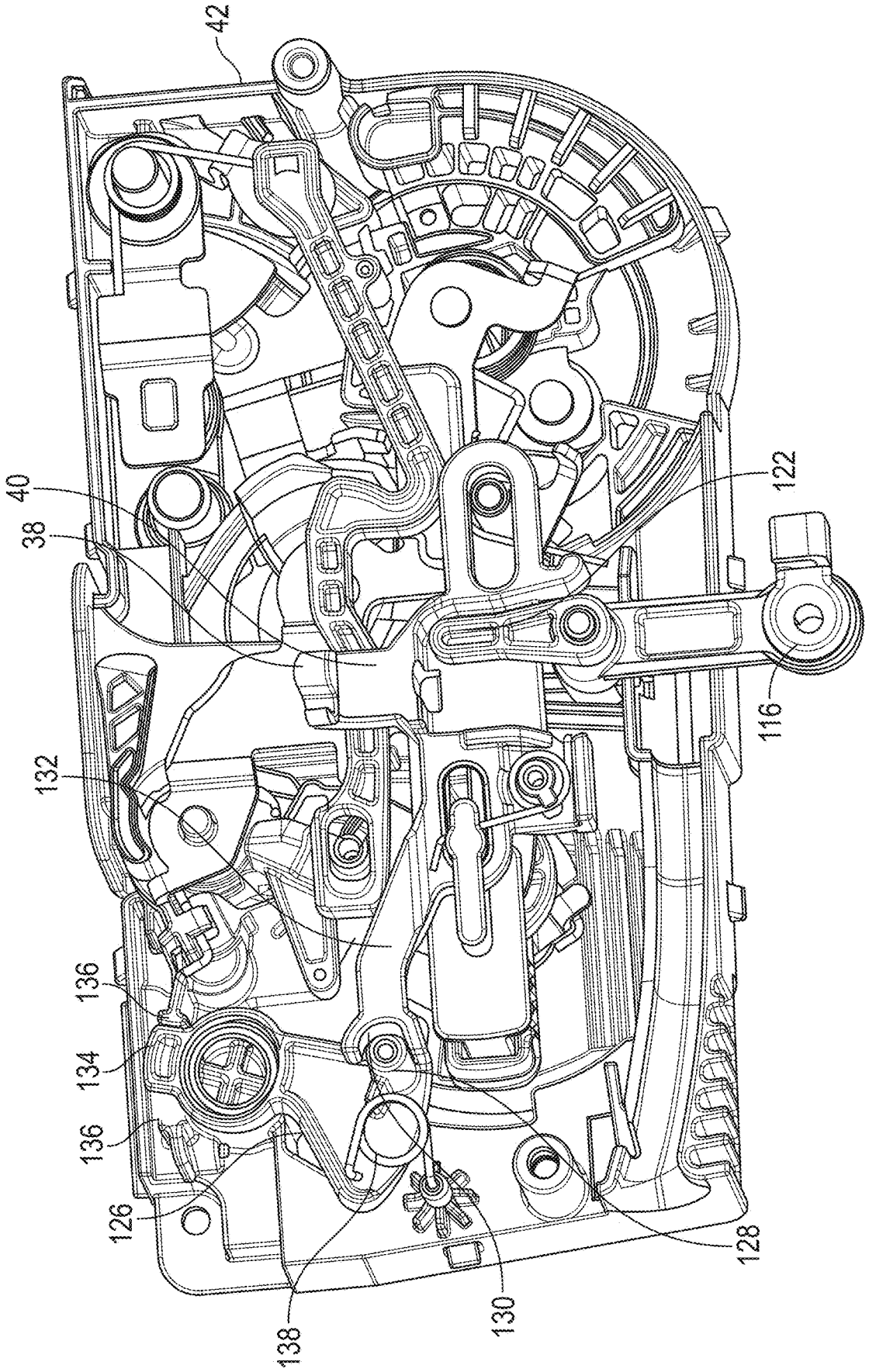


FIG. 27

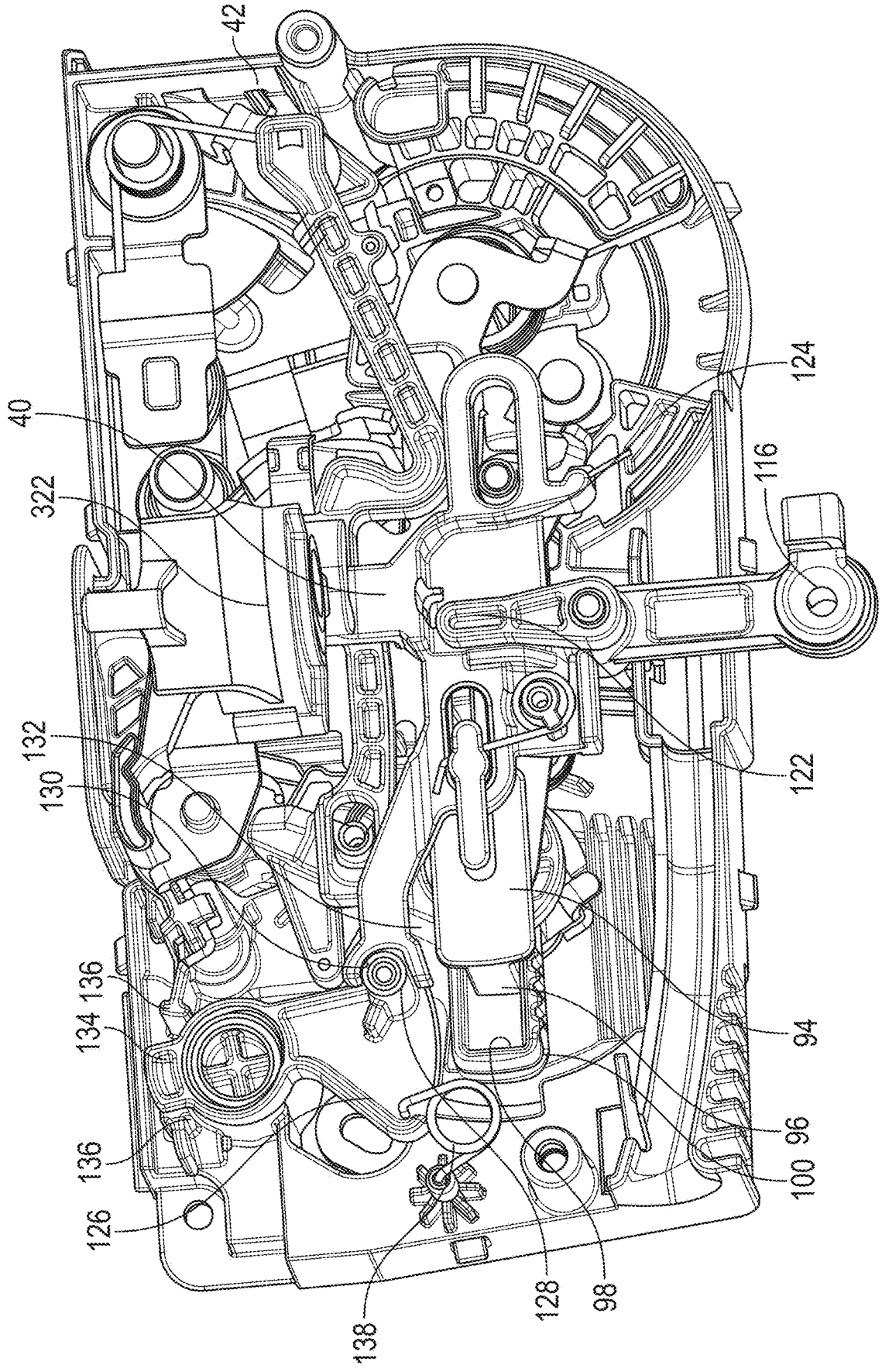


FIG. 28

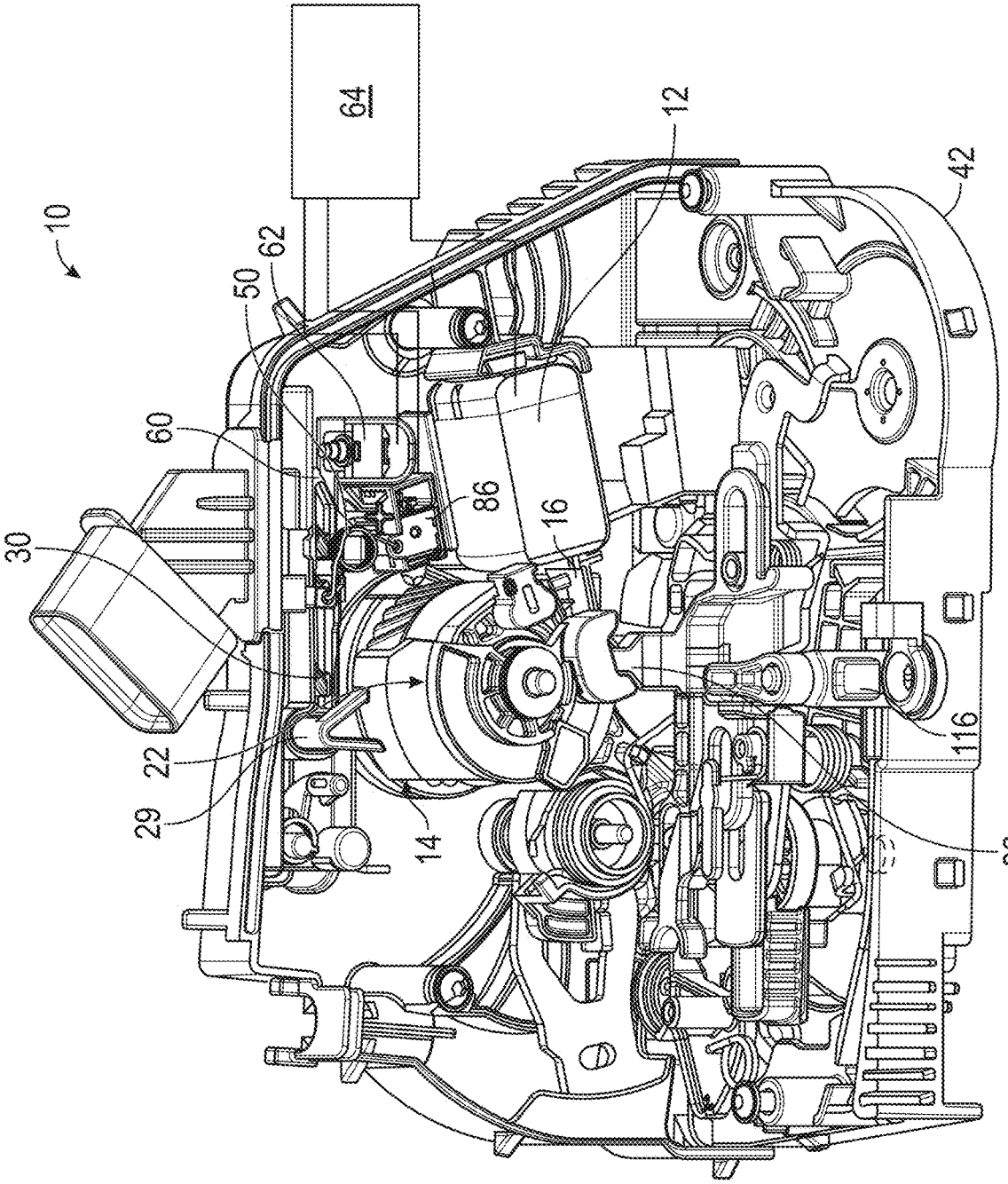


FIG. 29

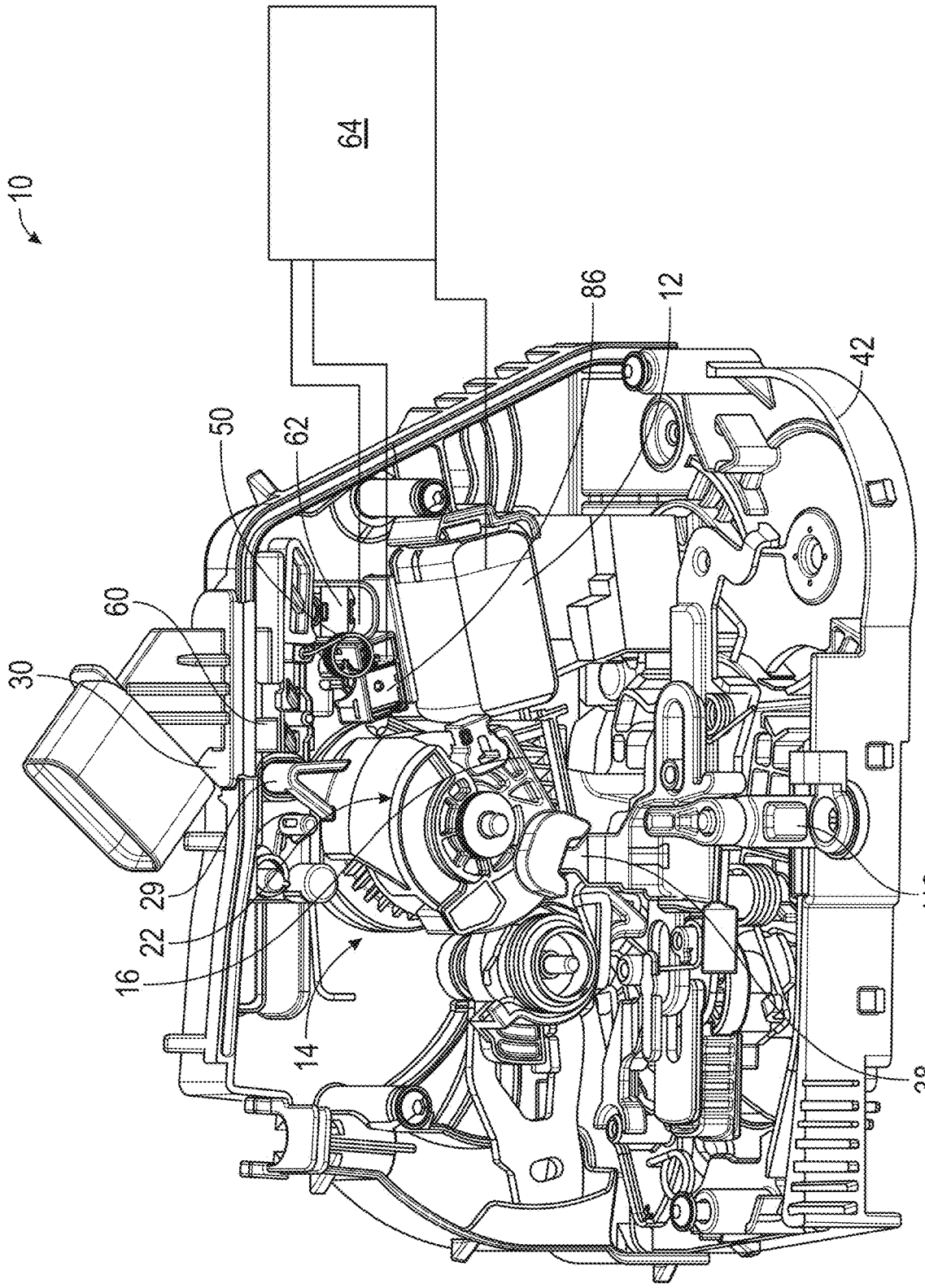


FIG. 30

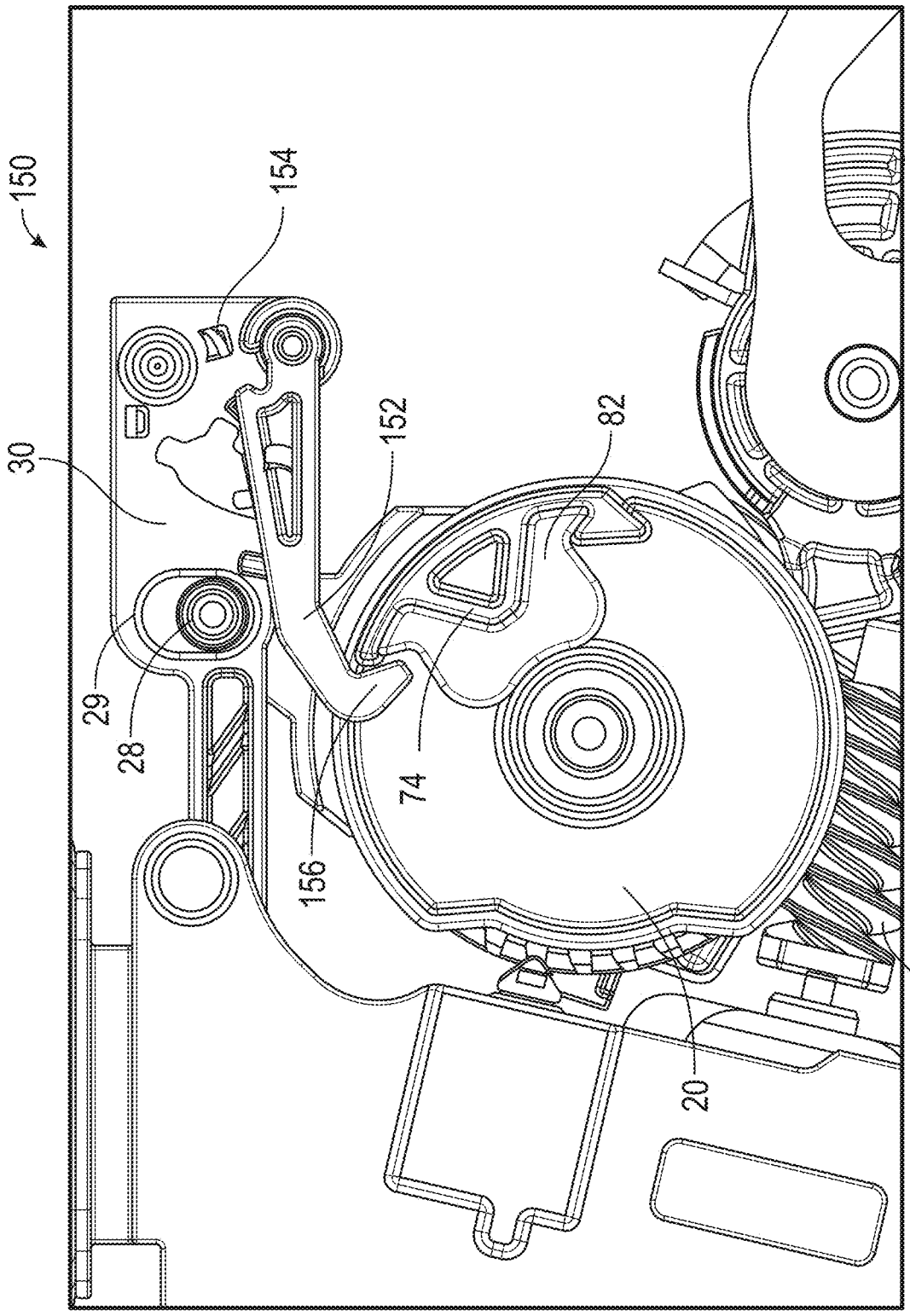


FIG. 31

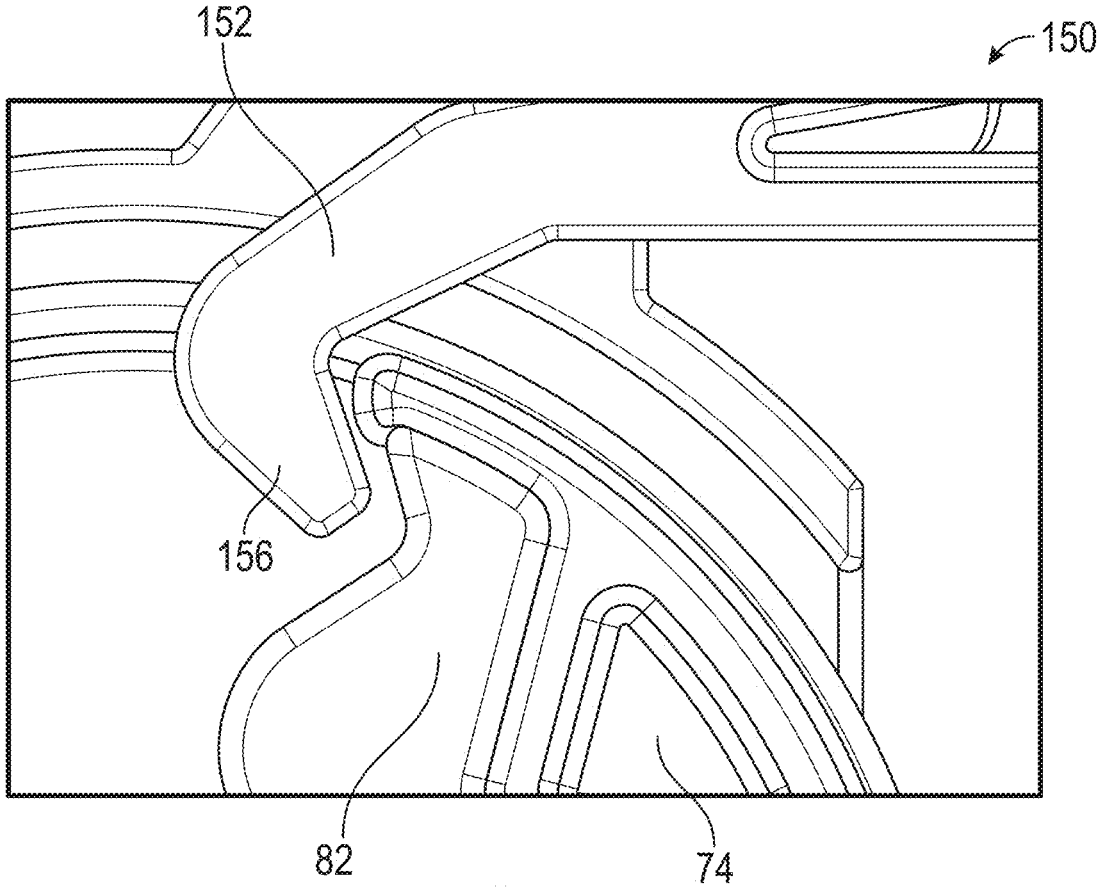


FIG. 32

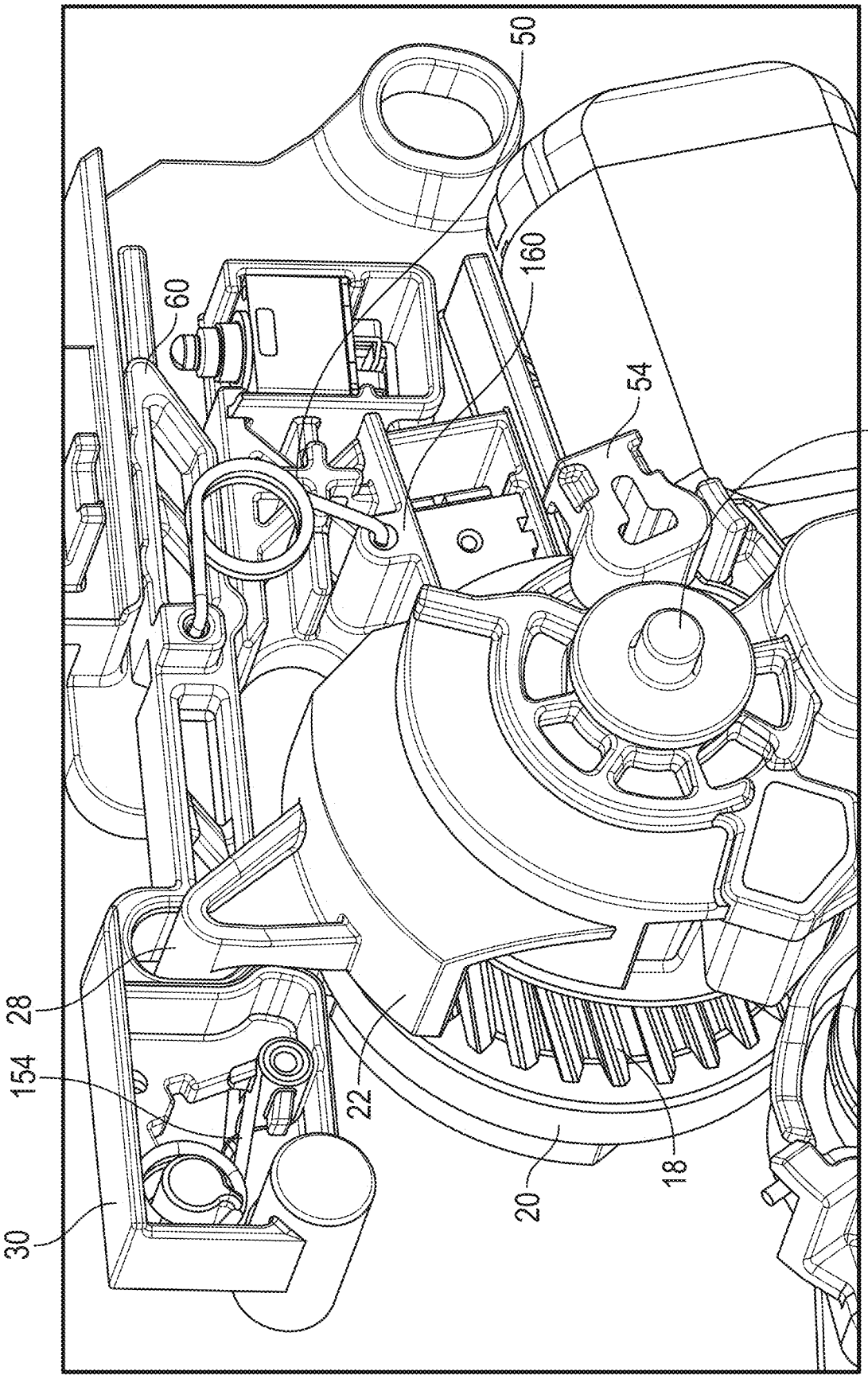


FIG. 33

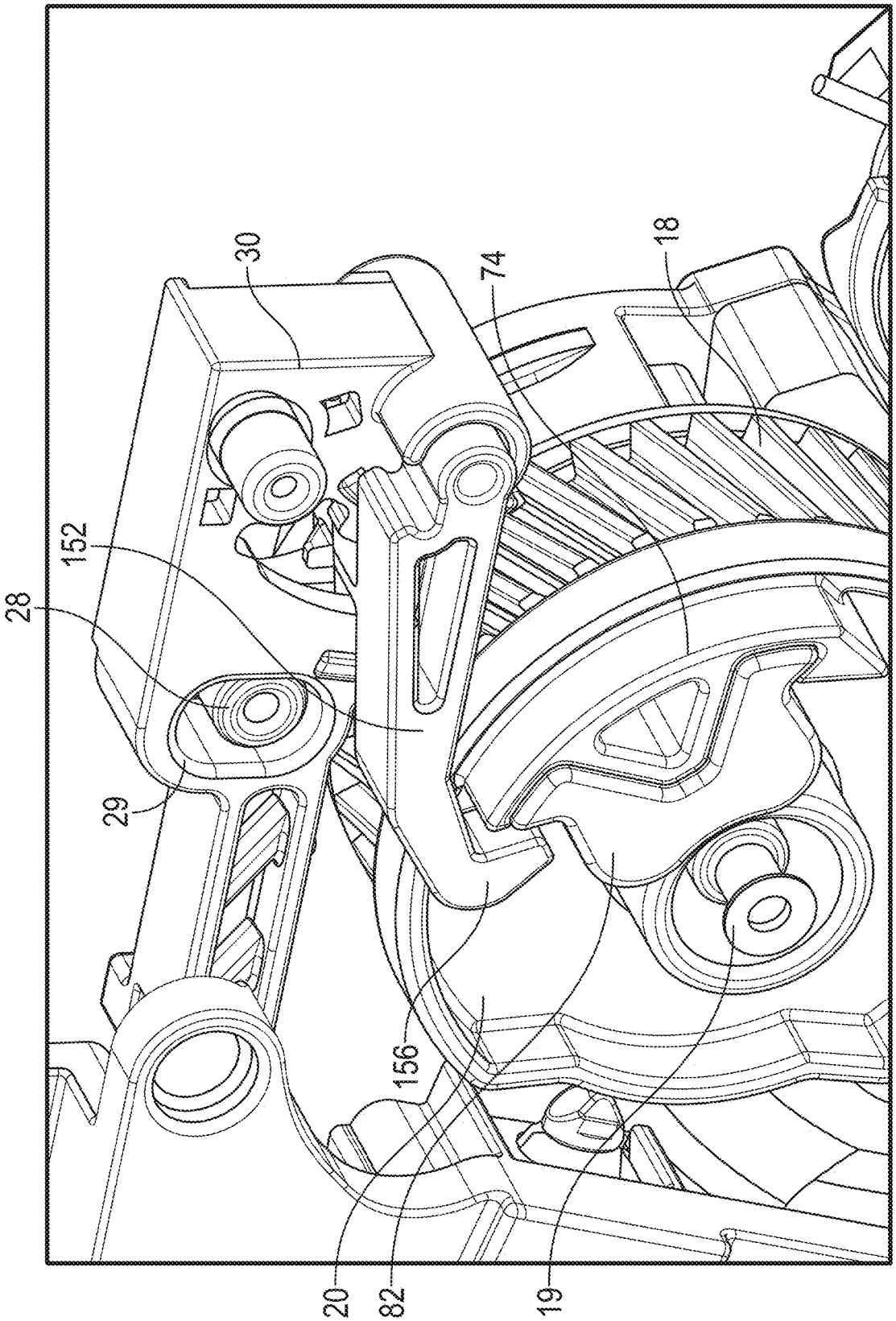


FIG. 34

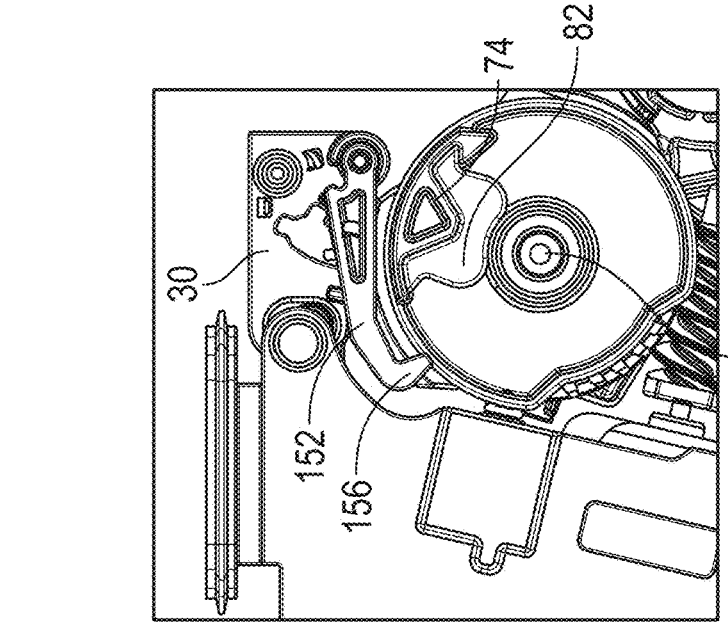


FIG. 35C

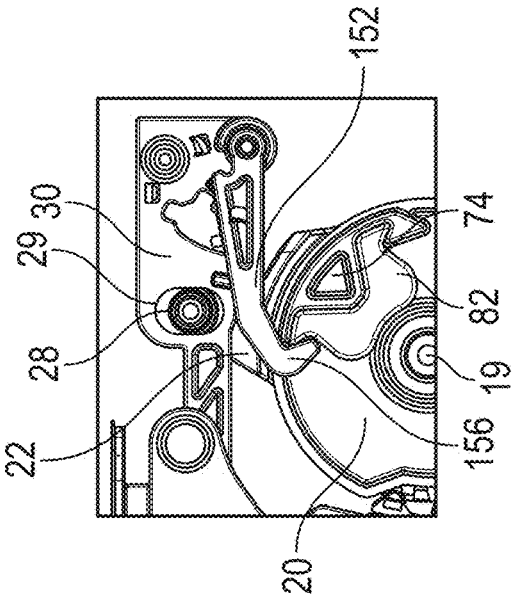


FIG. 35B

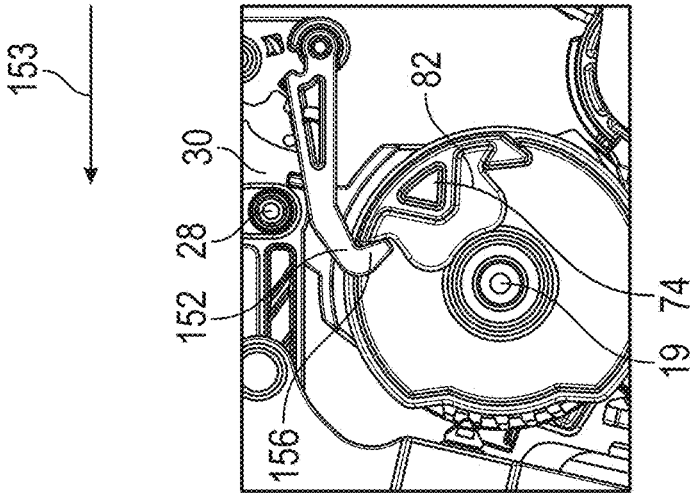


FIG. 35A

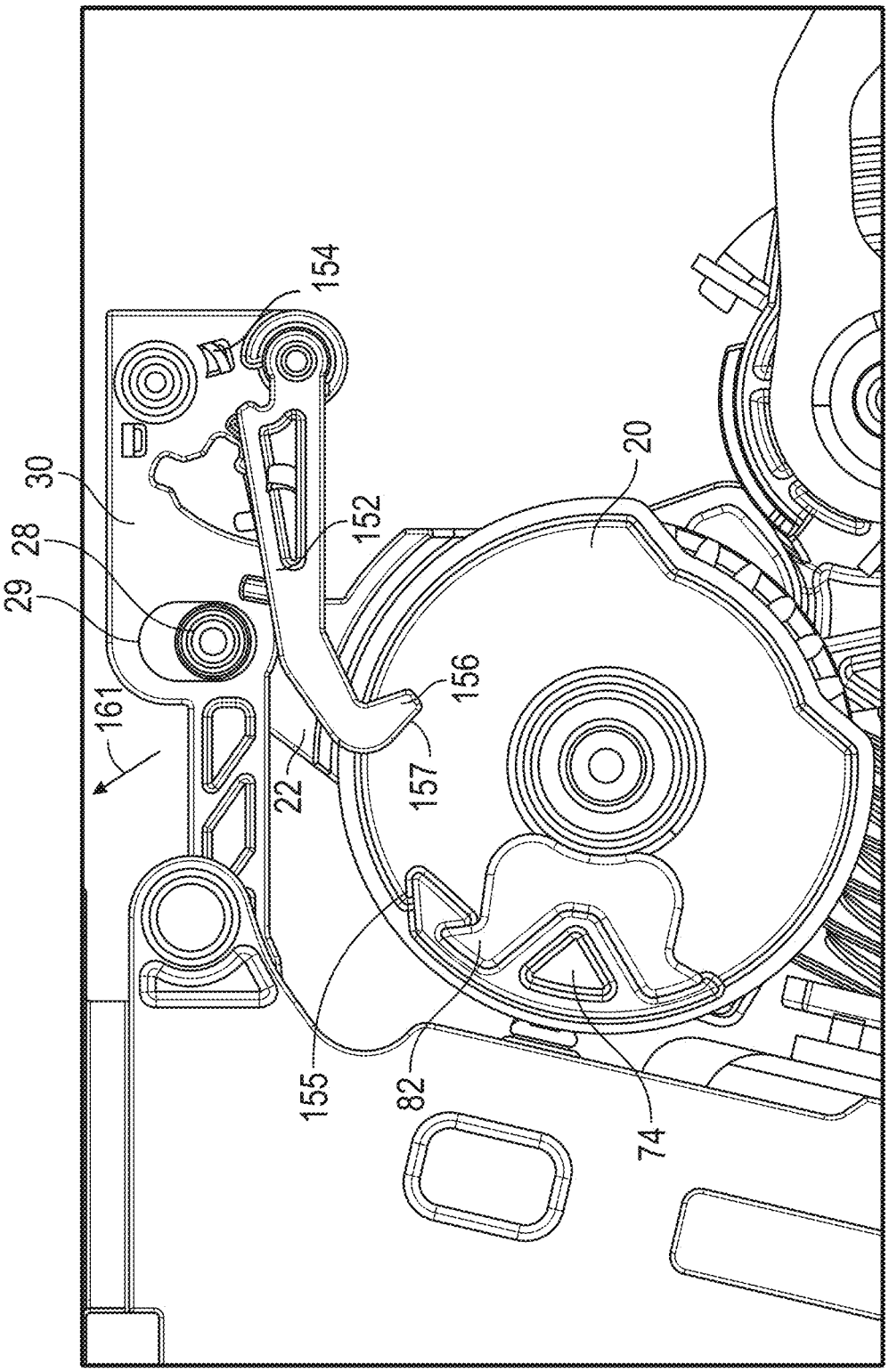


FIG. 35D

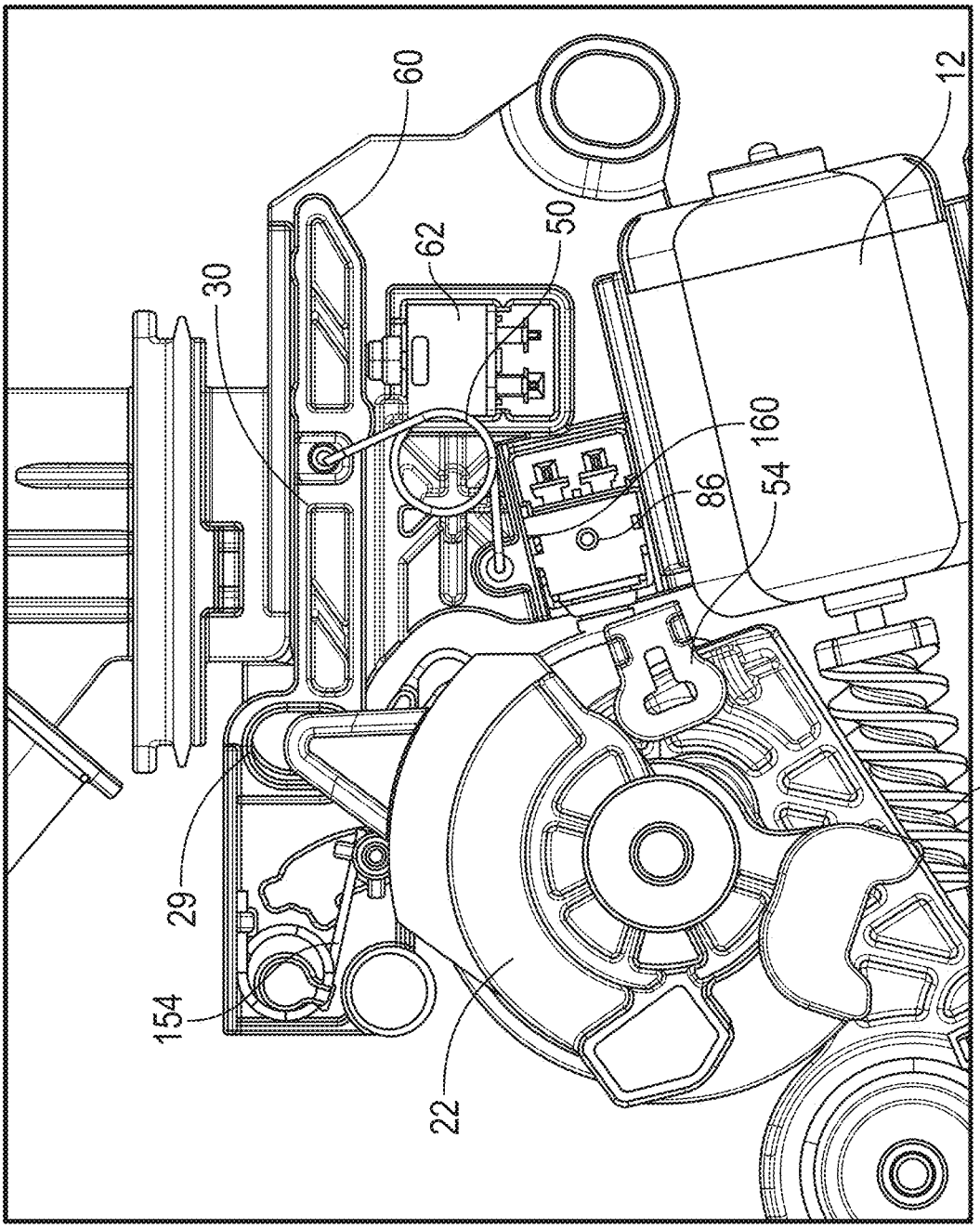


FIG. 36

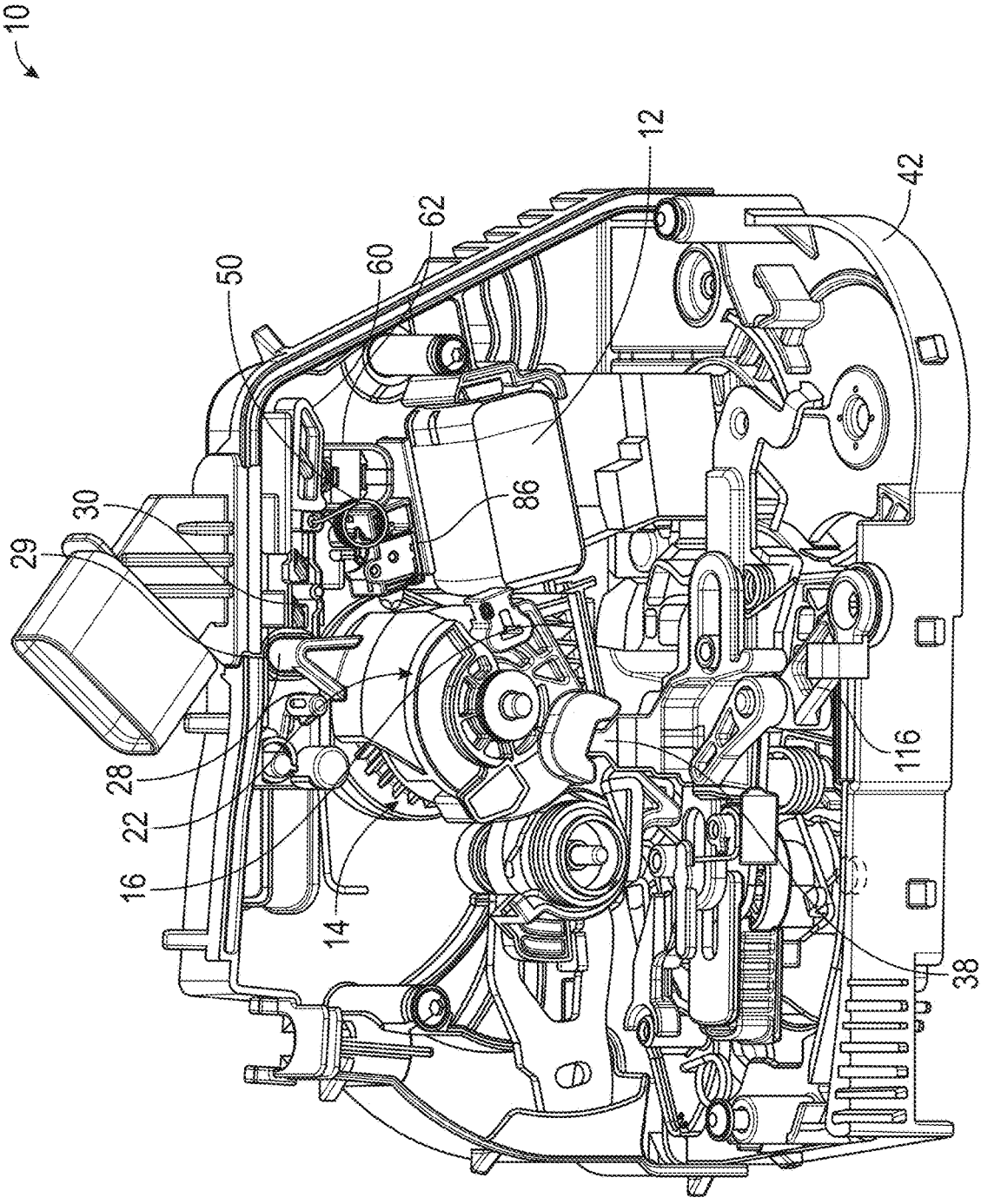


FIG. 37

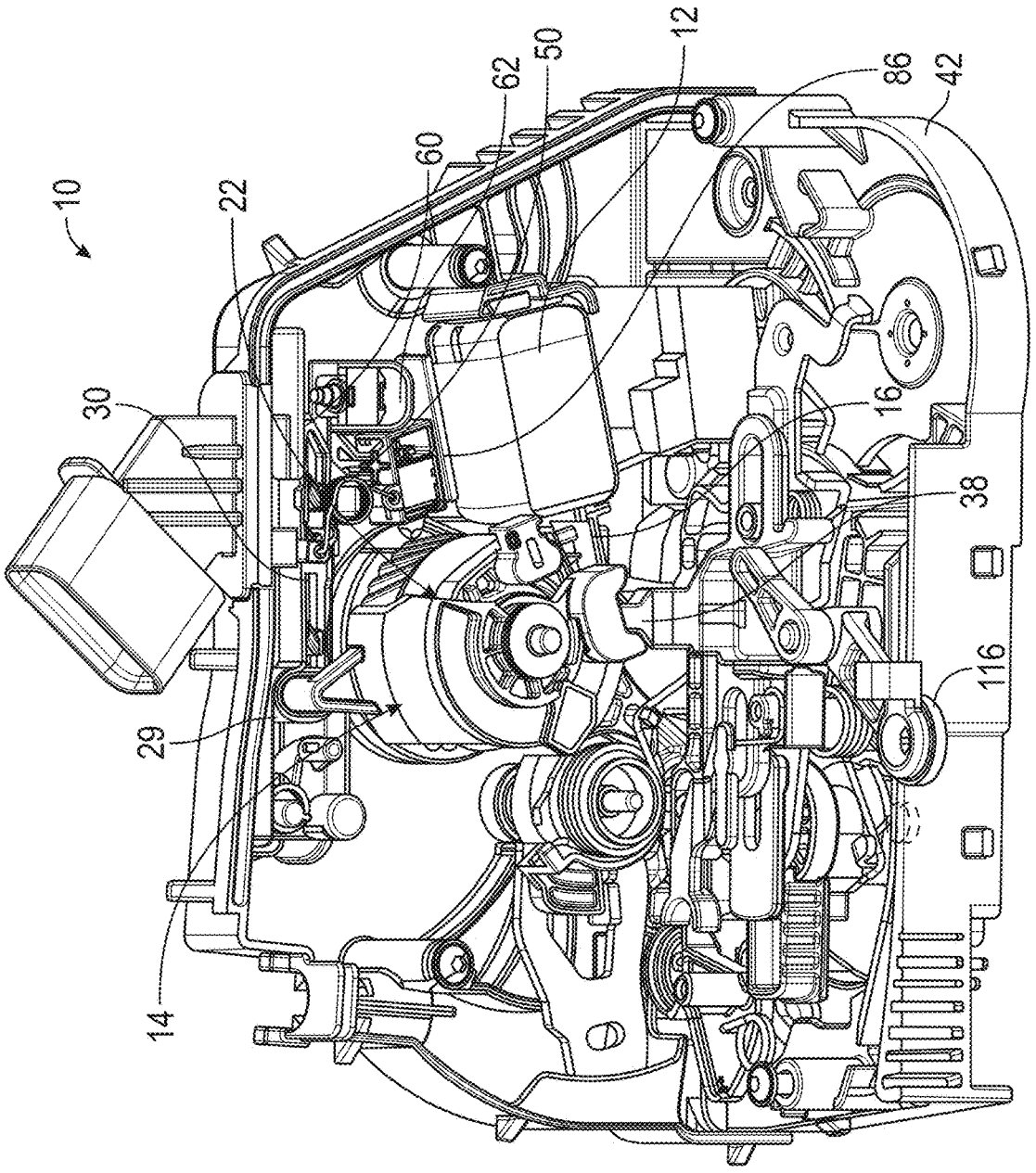


FIG. 38

VEHICLE DOOR LATCH

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 63/448,967 filed on Feb. 28, 2023, the contents of which are incorporated herein by reference thereto.

[0002] This application is also related to U.S. Provisional Patent Application No. 63/422,239 filed on Nov. 3, 2022 and this application is related to U.S. patent application Ser. No. 18/071,332 filed on Nov. 29, 2022, the contents each of which are incorporated herein by reference thereto.

BACKGROUND

[0003] Exemplary embodiments of the present disclosure pertain to the art of vehicle door latches.

[0004] Vehicle door latches include multiple components that cooperate with each other in order to provide operation of the vehicle door latch.

[0005] The automotive industry has become more and more competitive and complex. Thus, the closure systems need to rise to the challenge and become even more capable of improving their functionality by providing more in-depth functions that increase their reliability and their overall quality.

[0006] Reducing the number of components in a latch assembly and using them or using them for multiple functions is a difficult task to accomplish.

[0007] The closure systems are required to offer the final user the confidence that their vehicle door will open and close only when expected, ensuring their security on the road and when the vehicle is parked.

[0008] As such, it is desirable to provide an improved vehicle door latch wherein the latch which can operate as desired while reducing the number of components required for operation of the latch.

BRIEF DESCRIPTION

[0009] The proposed concept allows the latch to perform the power release/back drive function and power lock/unlock function using the same motor, in addition, it also contains the availability of performing mechanical lock/unlock in the event of a power loss. The single-motor removes the need to include a second motor which would affect the packaging of the latch so that it can continue to be compatible with many vehicles. It also highly influences the cost of the final product, making it competitive.

[0010] The proposed concept accomplishes essential functions while providing a more premium experience through an electrical performance, which allows functions such as power release, cinching, and lock/unlock, ensuring a pleasant interaction between the latch and the final user.

[0011] Disclosed is a vehicle latch, including: only a single motor the single motor performing the release/back drive function of the vehicle latch, power lock/unlock function of the vehicle latch, and mechanical lock/unlock of the vehicle latch in the event of a power loss.

[0012] Also disclosed is a vehicle latch, including: a drive assembly; a motor operably coupled to the drive assembly via a worm secured to a shaft of the motor, wherein rotation of the drive assembly by the worm performs one of a locking function and a power release of the vehicle latch.

[0013] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the drive assembly includes a power release gear, a reset lever secured to one side of the power release gear and a gear lock lever located on an opposite side of the power release gear, the gear lock lever being capable of independent movement with respect to the power release gear and the reset lever.

[0014] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, a surface of the power release gear has a cam feature that engages a bumper of the gear lock lever when the drive assembly of the vehicle latch is in a locked position and the gear lock lever is in a home position.

[0015] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the gear lock lever has an upper tab member operably coupled to a switch link that is movably mounted to an actuator housing of the vehicle latch.

[0016] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the upper tab member is received within an opening of the switch link.

[0017] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the gear lock lever has a lower portion that has a "U" shaped receiving area operably coupled to a tab of a lock link lever movably mounted to a housing portion of the vehicle latch.

[0018] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the actuator housing and the housing portion of the vehicle latch are separate components secured to each other.

[0019] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the actuator housing and the housing portion of the vehicle latch are integrally formed together as a single integral latch housing portion.

[0020] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, movement of the lock link lever from a first position to a second position will allow the vehicle latch to be opened by an outside release lever pivotally mounted to the housing portion.

[0021] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the outside release lever is operably coupled to a handle.

[0022] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the outside release lever is operably coupled to the handle via a cable.

[0023] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the lock link lever rests in a backplate and the lock link lever has two guide features that slide though two slots in the backplate.

[0024] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, when the power release gear is in a first position, the cam feature of the power release gear contacts the bumper of the gear lock lever which maintains the gear lock lever in the home position, which corresponds to the locked position of the drive assembly of the vehicle latch.

[0025] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, when the power release gear is rotated, and the cam feature no longer contacts the bumper the gear lock lever, the gear lock lever is spring biased into an unlock position by a lock link spring which provides a biasing force to a lock link lever movably mounted to a housing portion of the vehicle latch.

[0026] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, a switch link spring provides a biasing force to the switch link such that the lock link spring and the switch link spring will cause the gear lock lever to rotate when the power release gear is rotated and the cam feature no longer contacts the bumper the gear lock lever.

[0027] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the reset lever has a cam feature that is configured to engage complimentary cam features of the power release gear such that the reset lever can be secured to the power release gear.

[0028] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the cam feature of the reset lever has crush ribs that allows the reset lever to be interference fit or snap fit into the power release gear.

[0029] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the reset lever cam has another cam feature provided on an opposite side of the reset lever with respect to the cam feature, the another cam feature defining a recessed area that receives a bump portion of a spring.

[0030] In addition to one or more of the features described above, or as an alternative to any of the foregoing embodiments, the bump portion engages the recessed area when the reset lever is rotated into an unlock position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] The following descriptions should not be considered limiting in any way. With reference to the accompanying drawings, like elements are numbered alike:

[0032] FIG. **1** illustrates a portion of a vehicle latch with a gear lock lever in a home position in accordance with the present disclosure;

[0033] FIG. **1**A illustrates a portion of the vehicle latch with the gear lock lever removed in accordance with the present disclosure;

[0034] FIG. **2** is a perspective view of the gear lock lever, a power release gear, and a reset lever of the vehicle latch of the present disclosure;

[0035] FIG. **2**A is a partial sectional view of the gear lock lever;

[0036] FIG. **2**B is a perspective view of the power release gear;

[0037] FIG. **2**C is a perspective view of the reset lever;

[0038] FIG. **2**D is an exploded view of the reset lever and the power release gear;

[0039] FIG. **2**D' is a cross-sectional view of the reset lever and the power release gear;

[0040] FIG. **2**E is a rear perspective view of the gear lock lever of the present disclosure;

[0041] FIG. **2**F is perspective view illustrating interaction of the overmolded bumper of the gear lock lever interacting with the power release gear in accordance with the present disclosure;

[0042] FIG. **3** is a perspective view of the gear lock lever, a lock link and the power release gear of the latch of the present disclosure;

[0043] FIG. **4** is a perspective view a portion of the vehicle latch in accordance with the present disclosure;

[0044] FIG. **5** is a perspective view of the vehicle latch in a lock position in accordance with the present disclosure;

[0045] FIG. **6** is a perspective view of the vehicle latch in an unlock position in accordance with the present disclosure;

[0046] FIG. **7** is a perspective view of components of the vehicle latch in accordance with the present disclosure;

[0047] FIG. **8** is a perspective view of the gear lock lever in a lock position in accordance with the present disclosure;

[0048] FIG. **9** is a perspective view of the gear lock lever in an unlock position in accordance with the present disclosure;

[0049] FIG. **10** is a perspective view of components of the vehicle latch in accordance with the present disclosure;

[0050] FIG. **11** is a perspective view of components of the vehicle latch in accordance with the present disclosure;

[0051] FIG. **12**A illustrates the release lever of the vehicle latch when the vehicle latch is in the locked state;

[0052] FIG. **12**B illustrates operation of the release lever of the vehicle latch when the vehicle latch is in the locked state;

[0053] FIG. **13**A illustrates the release lever of the vehicle latch when the vehicle latch is in the unlocked state;

[0054] FIG. **13**B illustrates operation of the release lever of the vehicle latch when the vehicle latch is in the unlocked state;

[0055] FIG. **13**C illustrates operation of the release lever of the vehicle latch when the vehicle latch is in the unlocked state;

[0056] FIG. **14** illustrates operation of the release lever of the vehicle latch when the vehicle latch is in the unlocked state;

[0057] FIG. **15** is a perspective view of portions of the vehicle latch in accordance with the present disclosure;

[0058] FIGS. **16** and **17** are perspective views of portions of the vehicle latch in accordance with the present disclosure illustrating movement the reset lever;

[0059] FIGS. **18** and **19** are views of illustrating movement the reset lever;

[0060] FIG. **20** is a perspective view of the reset lever;

[0061] FIG. **21** is a perspective view of portions of the vehicle latch;

[0062] FIG. **22** is a perspective view of portions of the vehicle latch;

[0063] FIG. **23** is a perspective view of portions of the vehicle latch;

[0064] FIG. **24** is a perspective view of the vehicle latch in accordance with the present disclosure;

[0065] FIGS. **25**A-**28** illustrate movement of an emergency lock of the vehicle latch in accordance with the present disclosure;

[0066] FIG. **29** is a perspective view of the vehicle latch in a lock position in accordance with the present disclosure;

[0067] FIG. **30** is a perspective view of the vehicle latch in an unlocked position in accordance with the present disclosure;

[0068] FIG. **31** is a view of a clutch mechanism in accordance with the present disclosure;

[0069] FIG. **32** is an enlarged portion of the clutch mechanism;

[0070] FIG. **33** is a perspective view of the clutch mechanism in accordance with the present disclosure;

[0071] FIG. **34** is another perspective view of the clutch mechanism in accordance with the present disclosure;

[0072] FIGS. **35**A-**35**C illustrate movement of a switch link with the clutch mechanism in accordance with the present disclosure;

[0073] FIG. **35**D illustrates the situation where the reset lever has been rotated into a power release position and the switch link has subsequently been moved into a lock position in the event of a power loss;

[0074] FIG. **36** illustrates movement of the switch link with the clutch mechanism in accordance with the present disclosure;

[0075] FIG. **37** is a perspective view of portions of the vehicle latch moved into an unlock position via a key cylinder lever; and

[0076] FIG. **38** is a perspective view of portions of the vehicle latch moved into a lock position via a key cylinder lever.

DETAILED DESCRIPTION

[0077] A detailed description of one or more embodiments of the disclosed apparatus and method are presented herein by way of exemplification and not limitation with reference to the Figures.

[0078] The single-motor concept offers the capability of performing several latch functions electrically. Through only one motor, the latch will be capable of power releasing, back driving, locking, and unlocking. In the present disclosure, the lock/unlock functions are newly introduced and work by enabling/disabling the outside release lever pivoting on a latch housing to allow the user the freedom and security of ensuring that the side door of the vehicle will be closed or opened from the outside only when intended.

[0079] The home position for the proposed mechanism is also known as the locked state. In this state, the power release gear is in the fully back drive direction and contacts an over-molded bumper (as used herein and throughout this application and in one non-limiting embodiment bumper may refer to an elastomeric material capable of being deflected and absorbing impacts, one non-limiting material contemplated for bumpers is rubber or rubber-like polymers or equivalents thereof) located in the gear lock lever, ensuring that the latter maintains its position without any movement (this is also because of the dynamic brake in the power release motor). The gear lock lever pivoting on the power release gear will have a u-shape type of feature at its bottom that will allow the connection between this lever and the lock link. Consequently, the lock link will also have a counterpart geometry to allow the interaction between the gear lock lever and the lock link, which will cause that whenever the gear lock lever moves into the unlock or lock direction, the lock link will move too. The lock link will have a spring installed on the latch housing and sitting on the backplate, causing the mechanism to move into the unlock direction whenever the power release gear moves into the power release direction or unlock direction. The lock link will rest in a backplate and will have 2 guide features that slide though 2 slots in the backplate to ensure the lever's stability when its traveling to the lock or unlock position. When the gear lock moves into the unlocked position, a bumper installed in the cover will dampen and stop its rotation at 35 degrees of movement. Within the lock link geometry, there will be an "impatient passenger" spring; this spring will always have a torque applied to the bypass lever in case there is an impatient passenger scenario; this scenario is whenever the vehicle user pulls the outside release handle first before the unlock operation. The impatient passenger spring will allow the bypass lever to move into the unlock direction whenever the outside release lever goes back to its home position, preventing any jamming condition within the release mechanism. The bypass lever will pivot and travel along a channel feature located in the lock link. The bypass lever will also have a tab feature that will travel along a channel of a pawl release lever. The outside release lever pivoting in the latch housing will contact this tab, enabling the movement of the pawl release lever, thus, the movement of the pawl lifter and the pawl, releasing the claw, causing it to open the latch. Whenever the single motor latch is in the lock state, the tab feature in the bypass lever will move to disable the possibility of releasing the latch via the outside release lever.

[0080] In addition, a switch link lever or switch link will be coupled to the gear lock lever, so that whenever the gear lock lever rotates into the unlock direction, the switch link will travel along a channel located in the electronic component carrier (ECC), enabling the activation of the lock switch. This switch will serve as a redundancy switch (redundancy with the gear lock switch), to ensure that the lock/unlock activation can always be detected in case there is a switch failure in any of the switches. Because the unlock state happens at approximately 35 degrees of rotation, the mechanism must be capable of stopping the gear at a precise moment to avoid any overtravel and mitigate the risk of unintendedly power releasing the latch. To achieve a precise stop in the lock/unlock mechanism, a reset lever coupled to the gear will have a cam surface that will contact a switch, called the gear lock switch. This switch will be activated precisely at 35 degrees of rotation and will send a signal to the vehicle's DCU to stop the motor and consequently the worm and gear. In addition to the switch activation, the reset lever coupled to the gear, will have integrated a "U" feature that will interact directly with the inside release lever spring; when the mechanism is about to reach the 35 degrees of rotation, this "U" feature will get trapped between its counterpart located in the spring. This feature located in the reset lever, will help to reassure that the mechanism stops at the desire moment. In addition to that, the reset lever will have installed a power release bumper to dampen the sound and impact load whenever the latch goes to the power release direction or back drive direction. Also and instead of using a pin to pivot the power release gear, a new semi-tubular pivot is being introduced, this is with the purpose of better handling the stability of the power release mechanism and lock mechanism as it helps to have a better stack up between all of the components and also, improve the deformation between these because of the thrust load of the motor.

[0081] In an event of power loss at the vehicle, the latch shall be capable of locking or unlocking through a mechanical or manual mode. To make this possible, a key cylinder lever pivoting in the latch housing, will serve to manually unlock the latch. The key cylinder lever will have a tab that

will interact directly with the lock link so that whenever the key cylinder lever is rotated into the unlock position, this tab will push the lock link into this direction, consequently translating the bypass lever to make possible the manual release of the latch via the outside handle. Because the lock link is directly linked to the gear lock, the gear lock will move to the unlock state, and consequently the power release gear thanks to the overmolded bumper located in the gear lock. As mentioned before, the reset lever is married to the power release gear and will move whenever the latter moves. After performing the manual unlock via the key cylinder, the U shape feature located in the reset lever, will also get trapped into its counterpart in the inside release lever spring, this to ensure the position of the manual unlock.

[0082] Now, to lock the vehicle in case of power loss, an emergency lock lever pivoting in the latch housing, will have a key entry feature at its bottom (on the side of the frame) to ensure the vehicle user can insert a key to manually lock the latch. Whenever the user rotates the emergency lock lever into the lock position, the latter will translate the lock link into the lock position thanks to a post that will interact with this link. Consequently, the bypass lever will translate also to the lock position disabling the capability of manual releasing the latch via the outside release lever. To ensure that the emergency lock lever maintains its position, an overcenter spring installed into the latch housing and assembled in the emergency lock lever will ensure that either the lock or unlock state is achieved and maintained.

[0083] A side door latch is provided that can electrically lock/unlock, power cinch and power release the vehicle. It also offers mechanical functions, such as manual release, through both inside and outside, as well as key unlocking and emergency locking in case of a battery loss.

[0084] The electrical functions are sure to provide the final user a comfortable experience which allows them to interact with the vehicle door in a luxurious way. While the mechanical functions ensure that the user will still have a means to lock/unlock and open the side door.

[0085] The cinching mechanism offered by this latch works through a remote cinch actuator that is connected by a cable to the mechanism within the latch. The remote cinch actuator contains a motor that will send a pulse and consequently move a gear train. The gear driven is coupled to a cable lever which pulls the cinching cable, thus moving the cinching lever within the latch to allow the door to move from secondary position to primary closed position. The cinching mechanism also includes the means to override the function if necessary. This works through an interaction between an override link which pulls an override clutch lever, which in turn moves the override lever to allow the cinch link to bypass the claw.

[0086] The electrical functions within the latch work through a single motor which allows to power release and lock/unlock. There are some geometrical modifications that were made to accommodate this new and improved latch design. This is also the case for the outside release mechanism and the pawl release lever which is used for all the releases of the latch. The concept remains the same, but the geometry was enhanced to improve the functionality of these components into the new design.

[0087] The power release mechanism also has changes to accommodate the new mechanisms. A key element of this new latch is that it can perform the power release/back drive and lock/unlock functions through a single motor. This mechanism allows the final user to power lock/unlock the vehicle door from the outside, providing more security to the vehicle. This system consists of a gear lock lever that interacts with a lock link to enable/disable the outside release lever.

[0088] In addition, the latch also contains the ability to mechanically lock/unlock the latch in a battery loss event. Locking of the latch is achieved through an emergency lock lever and an over center spring that serve to enable the outside lever. Mechanically unlocking of the latch is achieved through a key cylinder lever that is assembled on the latch housing and directly interact with the lock link. A bypass lever is assembled on the latter and travels through the slot of the pawl release lever to enable the outside lever. In addition, this mechanism also contains an impatient passenger spring, so that if the final users pull on the handle while on the lock state, the vehicle door won't be opened. However, if during this interaction, the latch state changes to unlock, it will force the user to let go of the handle and pull it once again to open the vehicle door.

[0089] Referring now to the FIGS., a vehicle latch **10** in accordance with the present disclosure is illustrated. As mentioned above, a single motor **12** is used to perform several latch functions electrically. Through only the single motor **12**, the vehicle latch **10** will be capable of power releasing, back driving, locking, and unlocking. In other words, the vehicle latch **10** will only have one or a single motor **12**.

[0090] The single motor **12** is operably coupled to a drive assembly **14** via a worm **16** secured to a shaft of the single motor **12**. The drive assembly **14** may also be referred to as a lock mechanism and a power release mechanism. The drive assembly includes a power release gear **18**, a reset lever **20** secured to one side of the power release gear **18** and a gear lock lever **22** located on an opposite side of the power release gear **18**. The gear lock lever **22** is capable of independent movement with respect to the power release gear **18** and the reset lever. A surface of the power release gear **18** is configured to have a cam feature **24** that engages a bumper **26** of the gear lock lever **22** when the drive assembly **14** of the latch **10** is in a locked position where the gear lock lever **22** is in a home position. This position is illustrated in at least FIGS. **1**, **4** and **5**.

[0091] Also and instead of using a pin to pivot the power release gear **18**, a semi-tubular pivot **19** is used, this is with the purpose of better handling the stability of the power release mechanism and lock mechanism as it helps to have a better stack up between all of the components and also, improve the deformation between these because of the thrust load of the motor **12**.

[0092] The gear lock lever **22** has an upper tab member **28** operably coupled to a switch link or switch link lever **30** that is movably or slidably mounted to an actuator housing **32** of the vehicle latch **10**. The upper tab member **28** is received within an opening **29** of the switch link **30**. The gear lock lever **22** also has a lower portion **34** that has a "U" shaped receiving area **36** operably coupled to a tab **38** of a lock link lever **40** movably mounted to a housing portion **42** of the vehicle latch **10**. In one embodiment, the actuator housing **32** and the housing portion **42** of the vehicle latch **10** are separate components secured to each other or the actuator housing **32** and the housing portion **42** are integrally formed together as a single integral latch housing portion.

[0093] Movement of the lock link lever **40** from a first or locked position to a second or unlocked position will allow the vehicle latch **10** to be opened by an outside release lever **44** pivotally or moveably mounted to the housing portion **42**. The outside release lever **44** being operably coupled to a handle **46** (illustrated schematically) located on an exterior of a vehicle the vehicle latch **10** is secured to. The outside release lever **44** being operably coupled to the handle **46** via a cable **47** or any other equivalent device.

[0094] The lock link lever **40** will rest in a backplate **41** and will have two guide features **43** that slide though two slots **45** in the backplate **41** to ensure that the lock link lever's stability when its traveling to between the lock or unlock positions.

[0095] When power release gear **18** is in a first or home position, the cam feature **24** of the power release gear **18** contacts bumper **26** of the gear lock lever **22** which maintains the gear lock lever in the first or home position, which corresponds to the lock position of the vehicle latch **10**. In order to transition the vehicle latch **10** to the unlock position the single motor **12** is energized and the worm **16** is rotated and the power release gear **18** is rotated in a clockwise direction with respect to the views illustrated in at least FIGS. **1**, **2**A, **4** and **5**. This movement causes, the cam feature **24** to no longer contact bumper **26** of the gear lock lever **22**. The gear lock lever **22** is spring biased into a second or unlock position by a lock link spring **48** secured to the vehicle latch. The lock link spring **48** provides a biasing force to the lock link lever **40**. A switch link spring **50** secured to the vehicle latch provides a biasing force to the switch link **30**. In one non-limiting embodiment, the switch link spring **50** is a torsion spring secured to the latch cover **58** of the vehicle latch. The lock link spring **48** and the switch link spring **50** will cause the gear lock lever **22** to rotate in the clockwise direction with respect to the views illustrated in at least FIGS. **1**, **2**A, **4**, **5** and **8** from the first or home position (locked position) to the second or unlocked position, see at least FIGS. **6**, **9**.

[0096] When the power release gear **18** is rotated such that the cam feature **24** no longer contacts bumper **26**, the springs **48** and **50** cause movement of the switch link **30** and lock link lever **40** which will cause rotation of the gear lock lever **22** as it is operably coupled to switch link **30** and the lock link lever **40**. For example, upper tab member **28** engages the switch link **30** and the tab **38** of the lock link lever **40** is received in the receiving area **36** of the gear lock lever **22**.

[0097] The second or unlock position of the gear lock lever **22** is defined when a portion **52** of the gear lock lever **22** contacts a bumper **54** that is secured to an inner surface **56** of a latch cover **58** that is configured to be secured to the actuator housing **32**.

[0098] As previously mentioned, a reset lever **20** is secured to the power release gear. The reset lever **20** has a cam feature **68** that is configured to engage complimentary cam features **70** of the power release gear **18** such that the reset lever **20** can be secured to the power release gear **18**. The cam feature **68** of the reset lever **20** has crush ribs **72** that allow the reset lever to be interference fit or snap fit into the power release gear **18**.

[0099] On an opposite side of the reset lever **20** a cam feature **74** is provided. Cam feature **74** is provided on an opposite side to that of the cam feature **68**. Cam feature **74** defines a recessed area **76** that receives a bump portion **78** of a spring **80** secured to the vehicle latch. In one non-limiting embodiment, the spring **80** is secured to the of the actuator housing **32**. This bump portion **78** engages recessed area **76** when the reset lever **20** is rotated into the unlock position. See at least FIGS. **18** and **19**.

[0100] The reset lever **20** has a recessed periphery **84** that does not contact a primary switch **86** when the reset lever **20** is in the locked position (see at least FIG. **16**) and an outer periphery **88** of the reset lever **20** contacts the primary switch **86** when the reset lever **20** is in the unlocked position. Primary switch **86** is operably coupled to a controller **64**. Actuation of the primary switch **86** by the outer periphery **88** of the reset lever **20** will send a signal to the controller **64** that causes the single motor **12** to cease operation and indicate to the controller **64** that the vehicle latch **10** is in an unlocked state.

[0101] The movement of the gear lock lever **22** also causes movement of switch link **30**. The switch link **30** has a cam surface **60** that actuates a secondary switch **62** when the gear lock lever **22** is in the unlock position. The secondary switch is serves as a back up to the primary switch **86** in the event of a failure of the primary switch **86**. In one embodiment, the switches **62** and **86** are secured to an electronic circuit carrier **90**.

[0102] As mentioned above and during power unlock, which happens at approximately 35 degrees of rotation of the gear lock lever **22**, the mechanism must be capable of stopping the power release gear **18** at a precise moment to avoid any overtravel and mitigate the risk of unintendedly power releasing the latch **10**. To achieve a precise stop in the lock/unlock mechanism, the reset lever **20** coupled to the power release gear **18** will have a cam surface that will contact switch **86**, called the gear lock switch. This switch will be activated precisely at 35 degrees of rotation and will send a signal to the vehicle's door control unit (DCU) to stop the motor **12** and consequently the worm **16** and gear **18**. In addition to the switch activation, the reset lever **20** coupled to the gear **18**, will have integrated a "U" feature that will interact directly with the inside release lever spring **80**; when the mechanism is about to reach the 35 degrees of rotation, this "U" feature will get trapped between its counterpart located in the spring. This feature located in the reset lever, will help to reassure that the mechanism stops at the desire moment. In addition to that, the reset lever will have installed a power release bumper **82** to dampen the sound and impact load whenever the latch goes to the power release direction or back drive direction.

[0103] The bumper **82** of the reset lever **20** is configured to contact a feature located on an interior surface of the actuator housing **32**.

[0104] Since the lock link lever **40** is operably coupled to the gear lock lever **22** via tab **38** of the lock link lever **40** rotational movement of the gear lock lever **22** causes linear movement of the lock link lever **40** in the direction of arrows **92**.

[0105] A by-pass lever **94** is rotationally and slidably mounted to the lock link lever **40**. The by-pass lever **94** has a tab portion **96** that slides within an opening **98** of a pawl release lever **100** as the lock link lever slides in the direction of arrows **92**. The pawl release lever **100** is rotatably mounted to the latch housing **42**. The pawl release lever **100** is operably coupled to a pawl lifter **102** that is operably coupled to a pawl **104**. The pawl lifter **102** and the pawl **104** are rotatably mounted to a backing plate **106** of the vehicle latch **10**. Movement of the pawl **104** from an engaged

position, where the pawl **104** engages a claw **108** of the latch **10**, to an engaged position, where the pawl **104** no longer engages the claw **108** of the latch **10**, allows the claw **108** to rotate from a closed position to an open position.

[0106] In one embodiment, the claw **108** and the pawl **104** are rotatably mounted to the backing plate **106** and the claw **108** is spring biased into the open position by a spring and the pawl **104** is spring biased into the engaged position by a spring. When the pawl **104** is in the engaged position a portion of the pawl **104** engages a portion of the claw **108** in order to prevent the claw **108** from rotating from the closed position to the open position. When the pawl **104** is moved into the disengaged position the portion of the pawl **104** no longer engages the portion of the claw **108** and the claw **108** is free to rotate from the closed position to the open position.

[0107] The by-pass lever **94** also has a feature **109** that is moveably received within an opening **110** of the lock link lever **40**. When the lock link lever **40** is moved into the unlocked state by the gear lock lever **22** the by-pass lever **94** is moved by the lock link lever **40** such that tab portion **96** moves within opening so that it is in a position to be engaged by a tab portion **112** of the outside release lever **44**. This position is illustrated in at least FIGS. **11** and **13**A-**14**. As such, and when the outside release lever **44** is actuated the vehicle latch **10** will open.

[0108] When the lock link lever **40** is moved into the locked state by the gear lock lever **22**, the by-pass lever **94** is moved by the lock link lever **40** such that tab portion **96** moves within opening so that it is in a position not to be engaged by a tab portion **112** of the outside release lever **44**. This position is illustrated in at least FIGS. **10**, **12**A and **12**B. As such, and when the outside release lever **44** is actuated the vehicle latch **10** will not open.

[0109] During power release of the vehicle latch **10**, the single motor **12** is actuated and the power release gear **18** is rotated until the cam feature **24** of the power release gear **18** contacts a power release lever **114** rotatably mounted to the actuator housing **32**. The power release lever **114** is operably coupled to the pawl release lever **100** which is operably coupled to the pawl lifter **102** that is operably coupled to the pawl **104**. As mentioned above, movement of the power release lever **114** will ultimately move the pawl **104**.

[0110] The vehicle latch **10** also includes a key cylinder lever **116**. The key cylinder lever **116** is pivotally mounted to the latch housing portion **42**. In addition, the key cylinder lever **116** is operably coupled to a key cylinder **118** via a rod **120** or any equivalent structure. The key cylinder lever **116** has a tab portion **122** that is received in a receiving area **124** of the lock link lever **40** such that actuation of the key cylinder lever **116** from a first position (illustrated in at least FIG. **22**) to a second position (illustrated in at least FIG. **23**) the tab portion **122** contacts a wall of the receiving area **124** which causes movement of the lock link lever **40**, which moves the lock link lever **40** from the locked position (illustrated in at least FIG. **22**) to the second position (illustrated in at least FIG. **23**). The second position once again allows the outside release lever **44** to open the vehicle latch **10** as discussed above. The key cylinder function is particularly useful when the vehicle the vehicle latch is associated with has a power loss and manual unlocking of the vehicle latch **10** is desired.

[0111] The vehicle latch **10** also includes an emergency lock feature. The emergency lock feature is accessible from an exterior of the vehicle latch **10** and when actuated the emergency lock feature will transition the vehicle latch **10** from an unlocked state to a locked state. The emergency lock feature is provided by an emergency lock lever **126**. The emergency lock lever **126** has a post member **128** that is configured to contact a C or U shaped receiving area **130** of the lock link lever **40**. The C or U shaped receiving area **130** of the lock link lever **40** located on an arm member **132** of the lock link lever **40**. The emergency lock lever **126** also has a feature **134** that contacts a pair of complimentary stop portions **136** of the housing portion **42** of the vehicle latch **10**. An over center spring **138** is provided in order to keep the emergency lock lever **126** of the emergency lock mechanism in the locked position. The over center spring **126** provides a biasing force in order to keep the emergency lock lever **126** of the emergency lock mechanism in a locked position, which corresponds to the locked state of the vehicle latch. As illustrated in FIGS. **25**A-**28** movement of the emergency lock lever **126** will contact the lock link lever **40** in order to transition the vehicle latch **10** from the unlocked position to the locked position. The emergency lock lever **126** has a feature **140** that is accessible from an exterior of the vehicle latch **10**. In one non-limiting embodiment, the feature **140** may be a slot or opening that is configured to receive a portion of a tool such as a screwdriver or other equivalent structure.

[0112] The emergency lock feature of the vehicle latch **10** allows a user to manipulate the vehicle latch **10** from an unlocked state to a locked state which again is useful in the event of a power loss to the vehicle the vehicle latch is secured to.

[0113] Referring now to FIGS. **29**-**38**, an alternative embodiment of the present disclosure is illustrated. In this embodiment, the spring **80** and recessed area **76** is removed. Although and in yet another alternative embodiment, it is contemplated that the spring **80** and recessed area **76** can be incorporated into the below features of this embodiment. In addition to all of the aforementioned features and in this embodiment, a clutch mechanism **150** is incorporated into the switch link **30**. The clutch mechanism **150** includes a clutch lever **152** that is pivotally mounted to the switch link **30**. A spring **154** secured to the switch link biases the clutch lever **152** into an engagement position illustrated in at least FIGS. **31**, **32**, **34** and **35**A-**35**C. In this position, a hook portion **156** of the clutch lever **152** is positioned to engage a portion of the reset lever **20** and buffer **82** such that in the event the motor **12** is energized and movement of the reset lever **20** in a counter clockwise direction with respect to the views illustrated in FIGS. **35**A and **35**B occurs, the reset lever **20** will cause movement of the switch link **30**. When this occurs, the buffer **82** will contact the hook portion **156** and urge the switch link **30** in the direction of arrow **153**. As the switch link **30** moves in the direction of arrow **153** the spring **50**, which in this embodiment is an over center spring will transitioned from its urging force in a direction opposite to arrow **153** to an urging force in the direction of arrow **153**. As such, the initial movement of the reset lever **20** causes movement of the switch link **30** via the clutch mechanism and **150** and thereafter the spring **50** urges the switch link **30** in the direction of arrow **153**.

[0114] As used herein an over center spring is a spring that can be manipulated between first and second positions, which when in a first position provides a biasing force in a first direction (here opposite to arrow **153**) and when the

biasing force in the first direction is overcome and the spring is manipulated into the second position it then provides a biasing force in a different direction (here arrow **153**). For example and as used herein, spring **50** when in its first position will provide a first biasing force in a direction opposite to arrow **153** until the switch link **30** is moved in the direction of arrow **153** until the spring **50** moved into its second position and provides a biasing force in the direction of arrow **153** and assists in moving the switch link **30** into the unlock position.

[0115] Similarly and as the switch link **30** is moved from the unlock position to the lock position, the biasing force of the spring **50** in the direction of arrow **153** will be overcome and the spring will provide a biasing force in a direction opposite to arrow **153**.

[0116] Accordingly and when the motor **12** is energized during a power unlock function (movement of lock to unlock), power release gear **18** is rotated (counterclockwise with reference to at least FIG. **35**A) and the reset lever **20** operably coupled thereto is rotated (counterclockwise with reference to at least FIG. **35**A) and through the interaction of the clutch mechanism **150** with the reset lever **20**, the switch link **30** is moved in the direction of arrow **153** and the over center spring **50** changes it biasing force direction as mentioned above. Thereafter, and during a power lock operation (movement of unlock to lock), power release gear **18** is rotated in an opposite direction and the cam feature **24** of the power release gear **18** contacts the overmolded bumper **26** of the gear lock lever **22** and gear lock lever **22** moves and the switch link **30** moves back in a direction opposite to arrow **153** and the biasing force of spring **50** is once again changed.

[0117] It being understood that during a power release function the power release gear **18** and reset lever **20** may be further rotated in the same direction as the unlock function (counterclockwise with reference to at least FIG. **35**A) and if there is a subsequent power loss in that the power release gear **18** and reset lever **20** remain in a position corresponding to power release and the gear lock lever **22** is subsequently moved manually into a lock position by the key cylinder lever **116** (see at least FIG. **35**D) and then the power release gear **18** and reset lever **20** are moved back to the home position (see at least FIG. **35**B), there will be a need for the buffer **82** and cam feature **74** to bypass the clutch mechanism **150** such that in the event the motor **12** is energized and movement of the reset lever **20** in a clockwise direction with respect to the view illustrated in at least FIG. **35**D. This is achieved by a cam surface **155** of the reset lever **20** that will contact a surface **157** of the clutch lever **152** and urge it in the direction of arrow **161** against the biasing force of spring **154** so that the power release gear **18** and reset lever **20** can move back to the position illustrated in at least FIG. **35**B. It being understood that the biasing force of spring **154** will return the clutch lever **152** back to the position illustrated in at least FIG. **35**B once the power release gear **18** and reset lever **20** move back to the position illustrated in at least FIG. **35**B.

[0118] In yet another operation and if the power release gear **18** and reset lever **20** are not fully moved back to the home position due to a power loss and if the buffer **82** and the reset lever **20** is in a position to be engaged by the clutch mechanism and the switch link **30** is manually moved from an unlock position to a locked position by the key cylinder lever **116**, the reset lever **20** will also move if the reset lever **20** is in a position to be engaged by the hook portion **156** of the clutch lever and it has not fully returned to the home position. For example, the hook portion **156** may engage the cam feature **74** of the reset lever **20** or a elastomeric bumper or buffer **82** secured to the cam feature **74**. In this embodiment, the bumper or buffer **82** will have direct contact with the clutch lever **152** installed and pivoting on the switch link **30**.

[0119] The clutch mechanism **150** when engaged with the reset lever **20** thus also allows the reset lever **20** to be manually moved via the key cylinder lever **116** if the hook portion **156** of the clutch lever **152** is engaged with the cam feature **74** and the bumper or buffer **82** and the reset lever has not fully moved back to the home position when the switch link **30** is moved towards the lock position. Also and as described above, the engagement of the hook portion **156** with the elastomeric bumper or buffer **82** secured to the cam feature **74** causes movement of the switch link **30** as described above during power unlock.

[0120] As previously mentioned, the lock and unlock of the functions of the vehicle latch **10** depend on whether the bypass lever **94** is engaged with the outside release lever **44** or disengaged from the outside release lever **44**. The bypass lever **94** pivots in a slot **110** on the lock link lever **40** and as mentioned above the lock link lever **40** moves linearly between a lock or unlock position. The lock link lever **40** is connected to the gear lock lever **22** via a hook or tab **38** of the lock link lever **40** that is received in the gear lock lever **22**. The gear lock lever **22** pivots on the power release gear **18** which is secured to the reset lever **20** and which pivots on a semi-tubular pivot **19** of the actuator housing **32** of the vehicle latch **10**.

[0121] Whenever a power unlock function is requested, the motor **12** located in the actuator housing **32** will pulse to move the worm **16** installed on the motor shaft. The worm **16** then moves the power release gear **18**, thus also moving the reset lever **20** into the unlock position and stopping whenever the gear switch or primary switch **86** is activated (e.g., at 35 degrees of rotational movement of the power release gear **18** of course, other degrees of rotational movement greater or less than 25 degrees are contemplated). When the reset lever **20** moves, the cam feature **74** and the elastomeric bumper and/or buffer **82** simultaneously enable the movement of switch link **30** via the clutch lever **152**. Since the switch link **30** contains a slot feature or opening **29** where a post or upper tab member **28** of the gear lock lever is received, the gear lock lever **22** moves along with the switch link **30**. Whenever the clutch lever **152** and the switch link **30** are moving into the unlock position, the switch link spring **50**, which is an over center spring that is installed into an electronic component carrier **160** and the switch link **30**, assists in moving the switch link **30** into the unlock position after the over center spring **50** is moved to change is biasing force direction.

[0122] If there was a power loss to motor of the latch and the key cylinder lever **116** moved the lock link **30** and the gear lock lever **22** into the unlocked position, mechanically, and if the spring **50** was not an over center spring there was no way to subsequently hold the gear lock lever **22** again in the lock position since the locked position of the gear lock lever **22** depended solely on a force exerted by the cam feature **24** of the power release gear **18** into the overmolded bumper **26** of the gear lock lever **22**. In other words and during a mechanical movement of the gear lock lever **22** into

the unlocked position such as in the event of a power loss, there was no way to subsequently hold the gear lock lever **22** again in the lock position since there is no power to rotate the power release gear **18**. However and now that the spring **50** is an over center spring, movement of the gear lock lever **22** from the unlock position to the lock position via the key cylinder lever **116** will cause movement of the switch link **30** which will cause the biasing force of the spring to change as discussed above in order to maintain the lock link **30** and the gear lock lever **22** in the lock position.

[0123] As such and with the clutch mechanism **150**, the key cylinder lever **116**, which directly contacts the lock link **30** now has the capability of moving the gear lock lever **22** into the lock position or unlock position and maintain it thanks to the over center spring **50**. The clutch mechanism **150** now allows changes between lock state and unlock state independently of where the cam **24** of the power release gear **18** and the reset lever **20** is located. In case the power release gear **18** is out of its home designed position or fully backdriven position (see for example FIG. **35**D), and the clutch mechanism **150** and the switch link **30** are in their lock positions, the power release gear **18** and reset lever **20** need to have the capability of overriding the clutch mechanism **150**. This is achieved by pivotally mounting the clutch lever **153** and biasing the clutch lever **152** with the clutch spring **154**. As such, the reset lever **20** can safely pass the clutch lever **152** by lifting it up along its pivot and the clutch spring **154** will allow the clutch lever **152** to return to its original position.

[0124] Accordingly, the vehicle latch **10** can function with a single motor **12** that enables the latch **10** to perform power release, back drive, lock and unlock electrically. It also offers the capability to release the latch manually (inside and outside) and can also include a cinching function.

[0125] The term "about" is intended to include the degree of error associated with measurement of the particular quantity based upon the equipment available at the time of filing the application. For example, "about" can include a range of ±8% or 5%, or 2% of a given value.

[0126] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the present disclosure. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, element components, and/or groups thereof.

[0127] While the present disclosure has been described with reference to an exemplary embodiment or embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the present disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the present disclosure without departing from the essential scope thereof. Therefore, it is intended that the present disclosure not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this present disclosure, but that the present disclosure will include all embodiments falling within the scope of the claims.

What is claimed is:

1. A vehicle latch, comprising:

a drive assembly, wherein the drive assembly includes a power release gear, a reset lever secured to one side of the power release gear and a gear lock lever located on an opposite side of the power release gear, the gear lock lever rotatably mounted to the power release gear and the reset lever;

a switch link operably coupled to the gear lock lever;

an over center spring configured to be moved between a first position wherein the over center spring provides a first biasing force in a first direction to the switch link and a second position wherein the over center spring provides a second biasing force in a second direction to the switch link, the first direction being opposite to the second direction;

a clutch mechanism operably coupling the switch link to the reset lever; and

a motor operably coupled to the drive assembly via a worm secured to a shaft of the motor, wherein rotation of the drive assembly by the worm performs one of a locking function and a power release of the vehicle latch.

2. The vehicle latch as in claim **1**, wherein the clutch mechanism includes a clutch lever that is pivotally mounted to the switch link.

3. The vehicle latch as in claim **2**, wherein a spring secured to the switch link biases the clutch lever into an engagement position wherein a hook portion of the clutch lever will engage a portion of the reset lever.

4. The vehicle latch as in claim **3**, further comprising a key cylinder lever operably coupled to a lock link lever, the lock link lever is operably coupled to the gear lock lever.

5. The vehicle latch as in claim **4**, wherein the key cylinder lever is operably coupled to a key cylinder via a rod.

6. The vehicle latch as in claim **4**, wherein the key cylinder lever has a tab portion that is received in a receiving area of the lock link lever such that actuation of the key cylinder lever from a first position to a second position will cause the tab portion to contact a wall of the receiving area which causes movement of the lock link lever, which in turn moves the lock link lever between a locked position and an unlocked position.

7. The vehicle latch as in claim **1**, wherein a surface of the power release gear has a cam feature that engages a bumper of the gear lock lever when the drive assembly of the vehicle latch is in a locked position and the gear lock lever is in a home position.

8. The vehicle latch as in claim **7**, wherein the gear lock lever has an upper tab member operably coupled to the switch link that is movably mounted to an actuator housing of the vehicle latch.

9. The vehicle latch as in claim **8**, wherein the upper tab member is received within an opening of the switch link.

10. The vehicle latch as in claim **8**, wherein the gear lock lever has a lower portion that has a "U" shaped receiving area operably coupled to a tab of a lock link lever movably mounted to a housing portion of the vehicle latch.

11. The vehicle latch as in claim **10**, wherein the actuator housing and the housing portion of the vehicle latch are separate components secured to each other.

12. The vehicle latch as in claim **10**, wherein the actuator housing and the housing portion of the vehicle latch are integrally formed together as a single integral latch housing portion.

13. The vehicle latch as in claim **10**, wherein movement of the lock link lever from a first position to a second position will allow the vehicle latch to be opened by an outside release lever pivotally mounted to the housing portion.

14. The vehicle latch as in claim **13**, wherein the outside release lever is operably coupled to a handle.

15. The vehicle latch as in claim **14**, wherein the outside release lever is operably coupled to the handle via a cable.

16. The vehicle latch as in claim **10**, wherein the lock link lever rests in a backplate and the lock link lever has two guide features that slide though two slots in the backplate.

17. The vehicle latch as in claim **7**, wherein when the power release gear is in a first position, the cam feature of the power release gear contacts the bumper of the gear lock lever which maintains the gear lock lever in the home position, which corresponds to the locked position of the drive assembly of the vehicle latch.

18. The vehicle latch as in claim **17**, wherein when the power release gear is rotated and the cam feature no longer contacts the bumper the gear lock lever, the gear lock lever is spring biased into an unlock position by a lock link spring which provides a biasing force to a lock link lever movably mounted to a housing portion of the vehicle latch.

19. The vehicle latch as in claim **18**, wherein the over center spring provides a biasing force to the switch link such that the lock link spring and the over center spring will cause the gear lock lever to rotate when the power release gear is rotated and the cam feature no longer contacts the bumper the gear lock lever.

20. The vehicle latch as in claim **1**, wherein the reset lever has a cam feature that is configured to engage complimentary cam features of the power release gear such that the reset lever can be secured to the power release gear and the cam feature of the reset lever has crush ribs that allows the reset lever to be interference fit or snap fit into the power release gear and the reset lever has another cam feature provided on an opposite side of the reset lever with respect to the cam feature, the another cam feature contacting the clutch mechanism.

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