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(54) **LATCH WITH MAGNETICALLY-ASSISTED OPERATION FOR INFORMATION HANDLING SYSTEMS (IHSS)**

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F16M 11/10 (2006.01)
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(52) **U.S. Cl.**
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See application file for complete search history.

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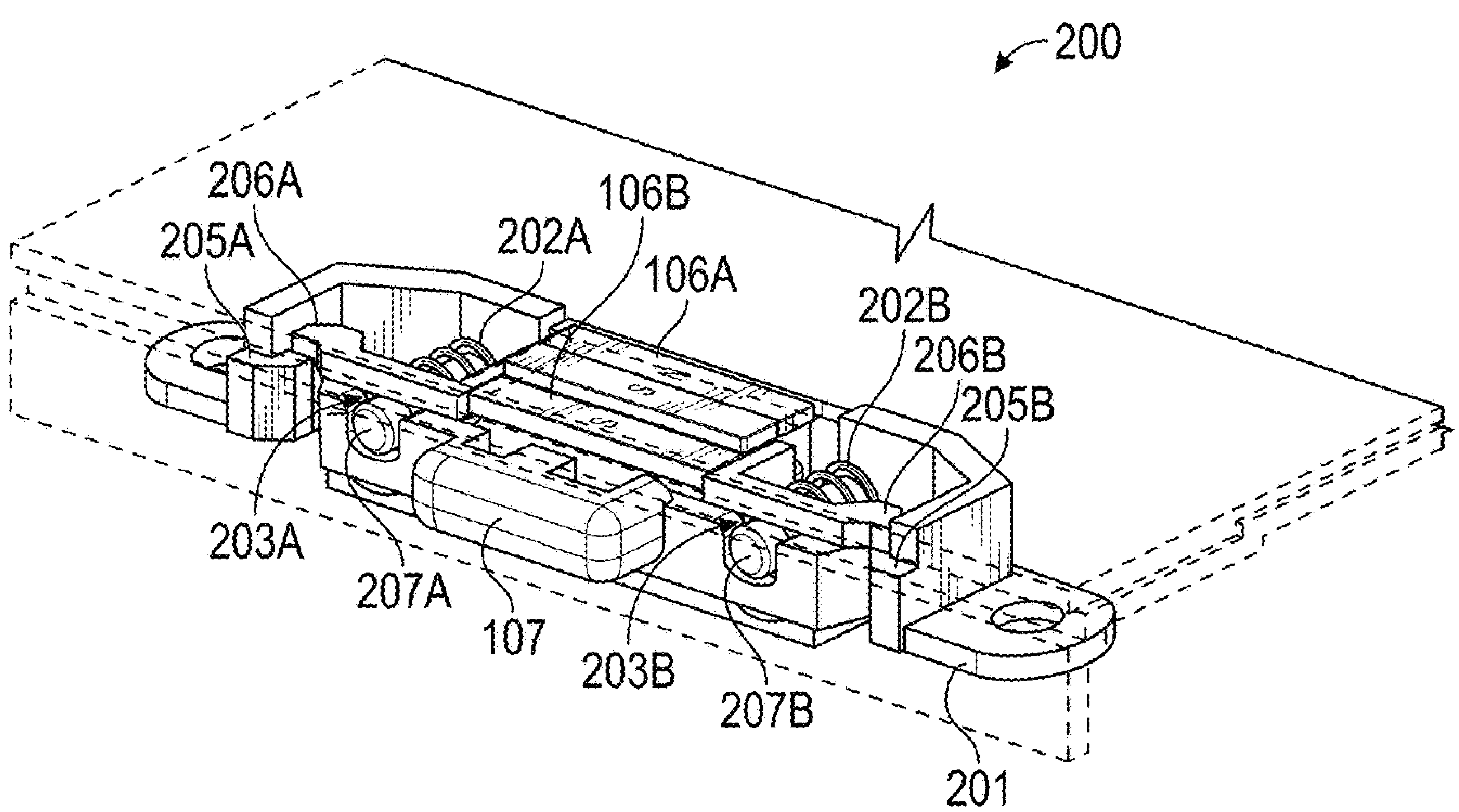
(74) *Attorney, Agent, or Firm* — Fogarty LLP

(57) **ABSTRACT**

A latch with magnetically-assisted operation is described. In some embodiments, a latch may include: a first magnetic device fixedly coupled to a first portion of an Information Handling System (IHS); a second magnetic device coupled to a second movable portion of the IHS; and a carrier, comprising: a compression bracket fixedly coupled to the first portion of the IHS, the compression bracket having a slot configured to accommodate the second magnetic device, at least one guidepost configured to receive a return spring, and at least one stopping pin; and a actuator bracket movably coupled to compression bracket, the actuator bracket having a button configured to translate the second magnetic device with respect to the first magnetic device, at least one orifice configured to engage with the at least one guidepost, and at least one detent configured to engage with the at least one stopping pin.

18 Claims, 7 Drawing Sheets



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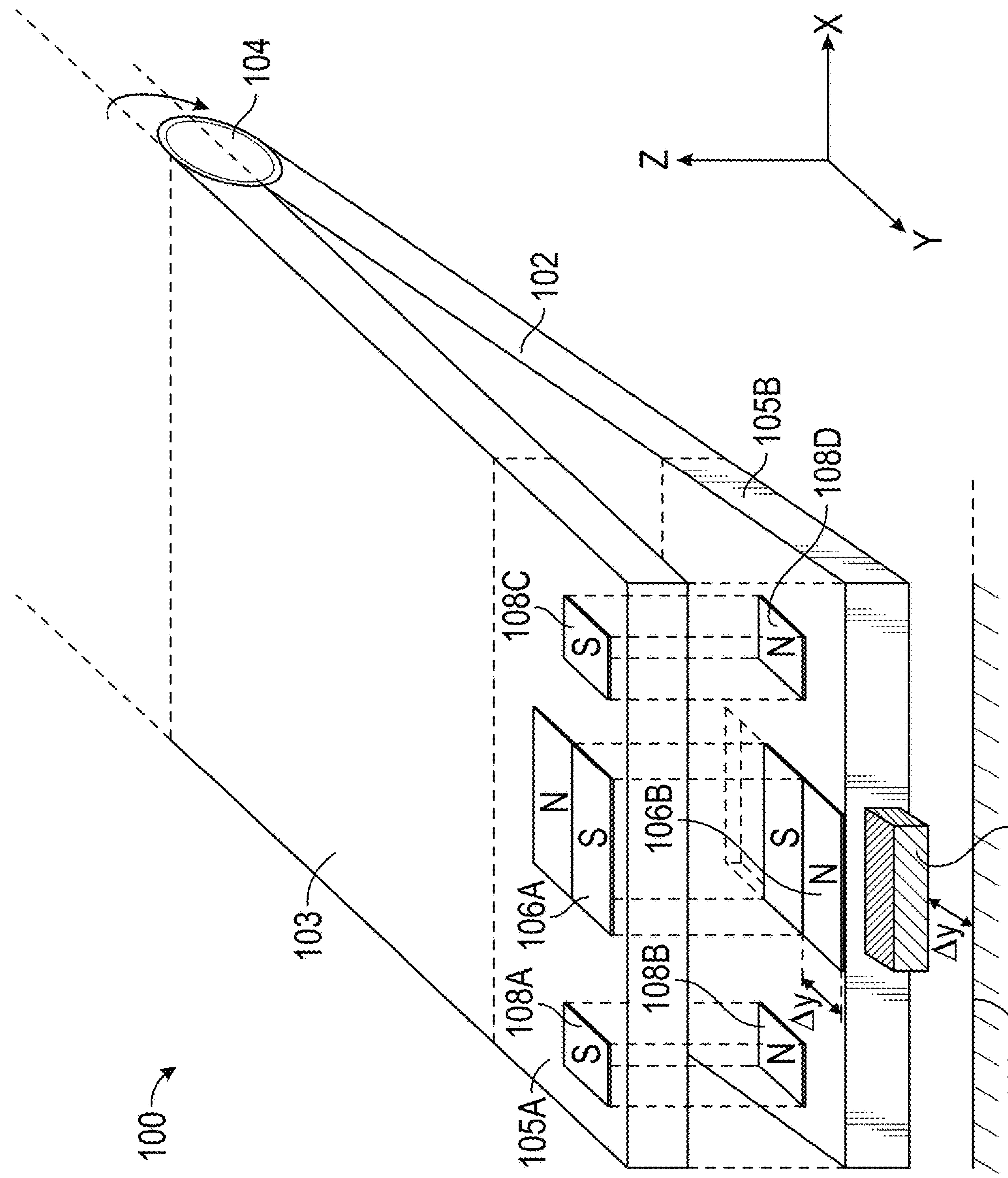
100
101
102
103
104
105A
105B
106A
106B
107
108A
108B
108C
108D
X
Y
Z
N
S
Δy

FIG. 1

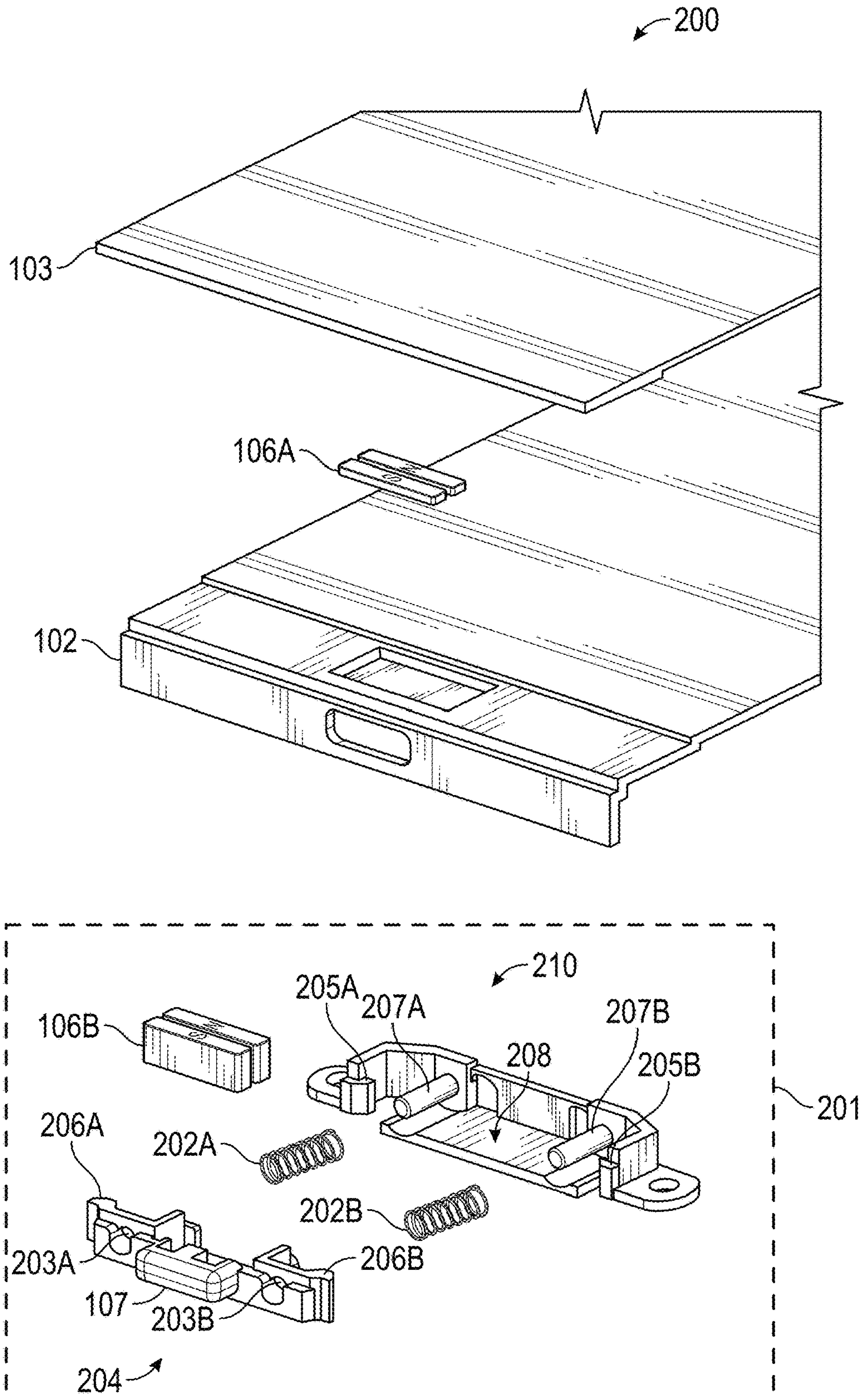
200
103
106A
102
210
205A
207A
207B
106B
208
205B
201
206A
202A
202B
203A
206B
107
203B
204

FIG. 2

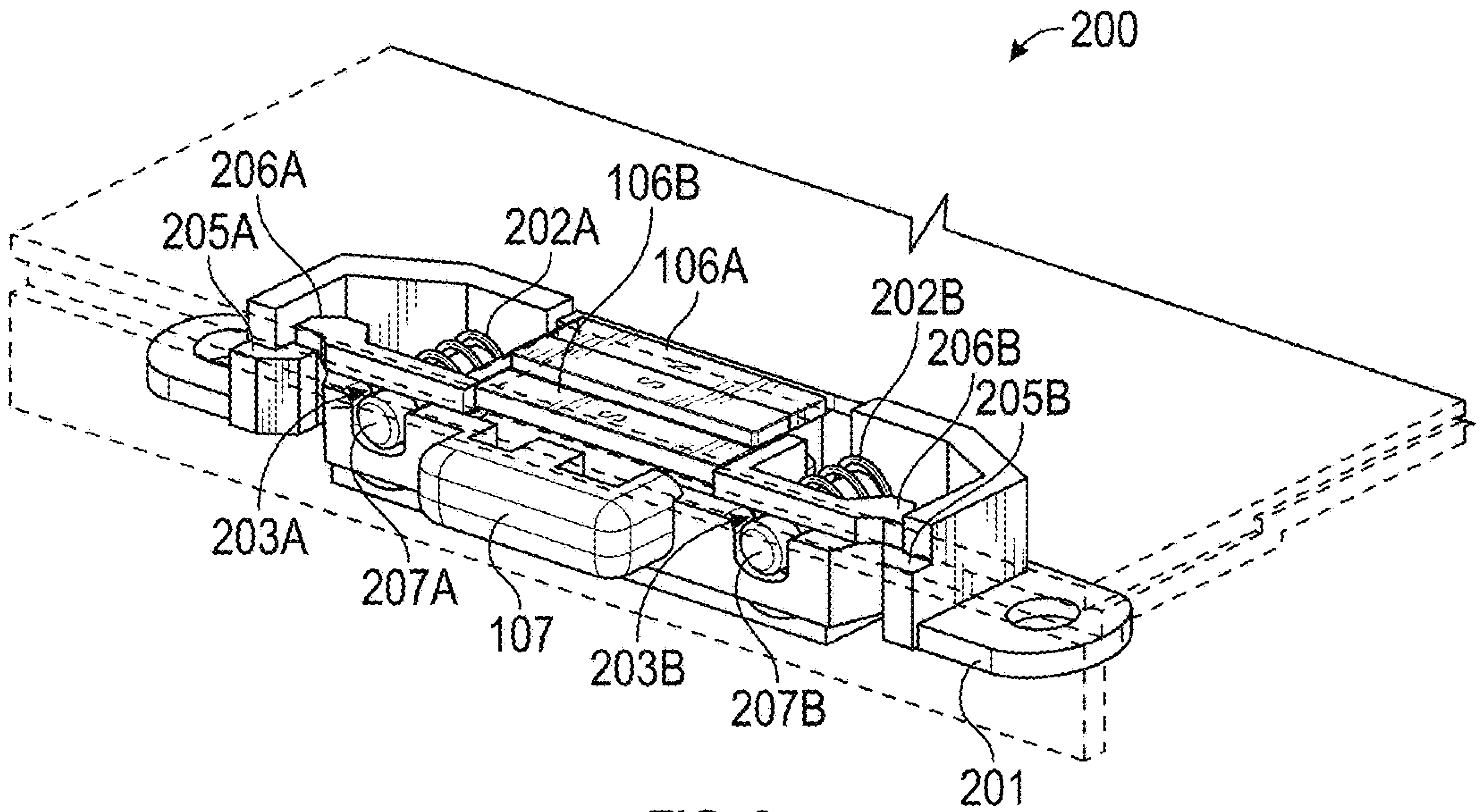
200
206A
205A
202A
106B
106A
202B
206B
205B
203A
207A
107
203B
207B
201

FIG. 3

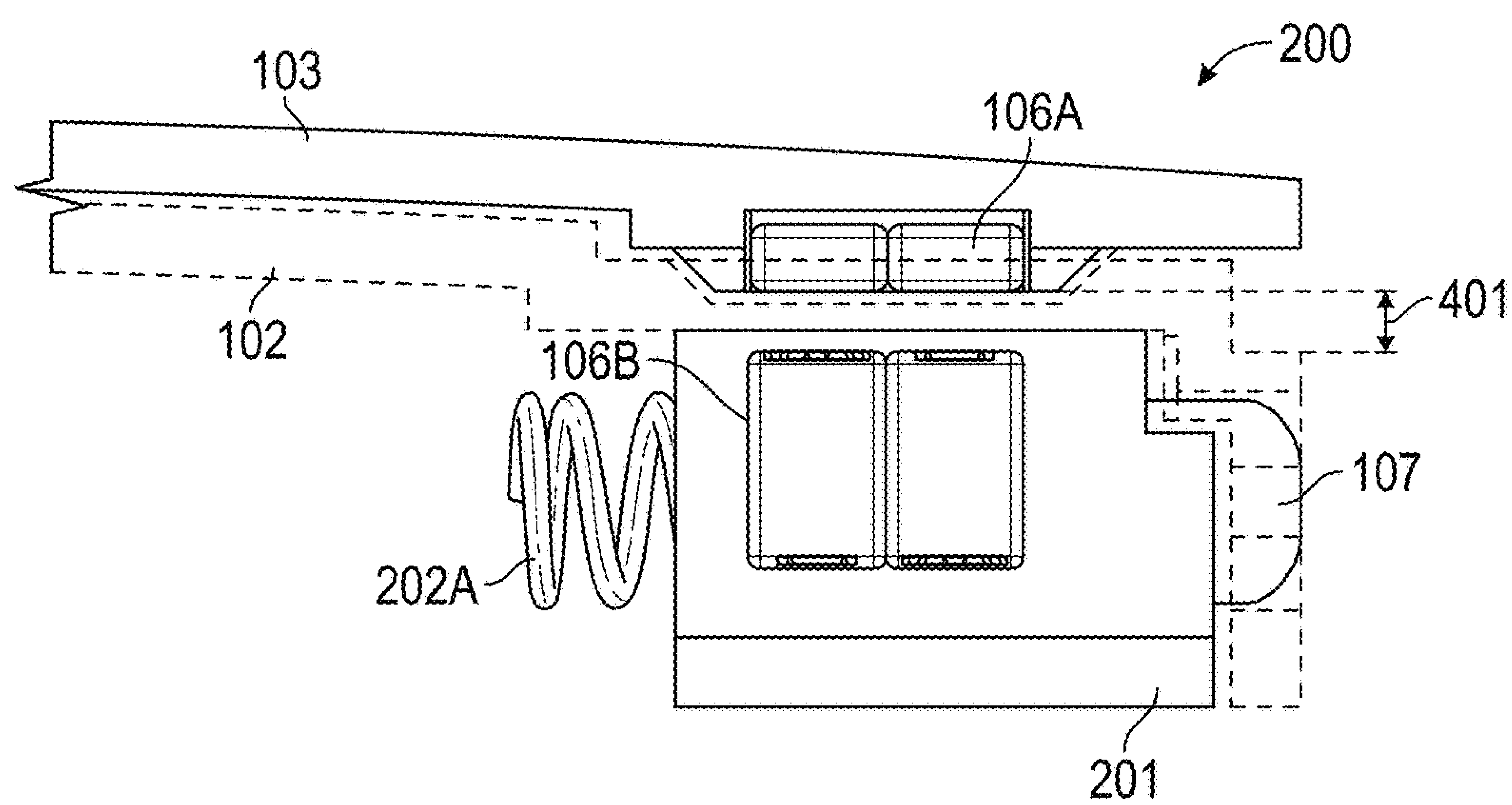
200
103
106A
102
401
106B
107
202A
201

FIG. 4

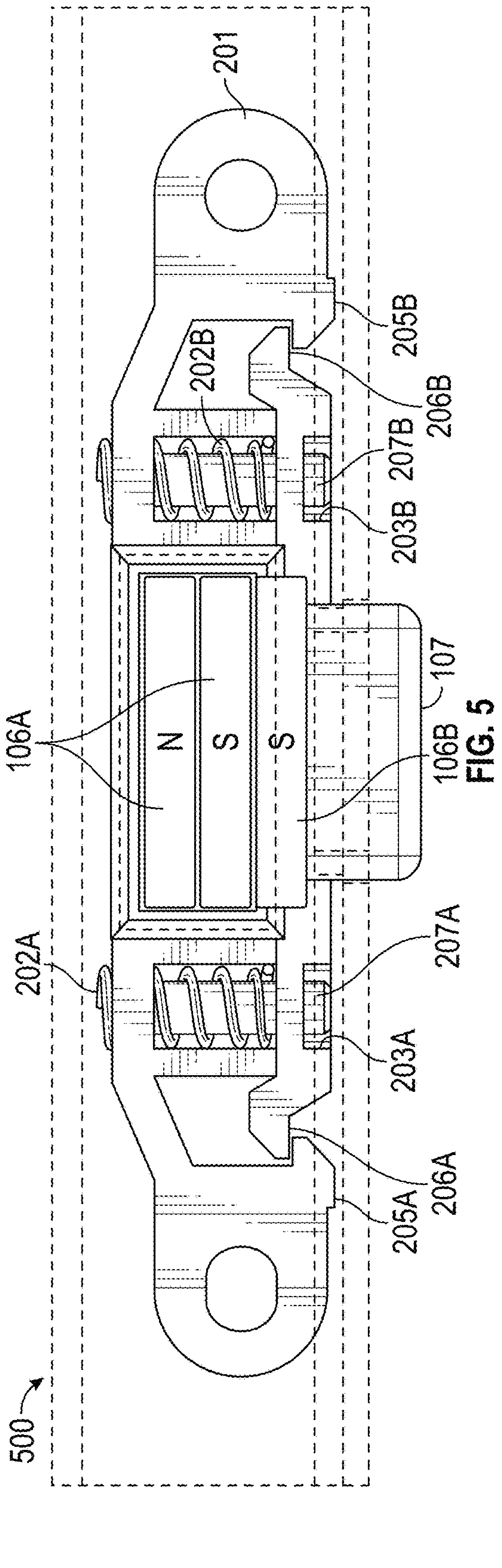
500
201
205B
202B
206B
207B
203B
106A
N
S
S
107
106B
202A
207A
203A
206A
205A

FIG. 5

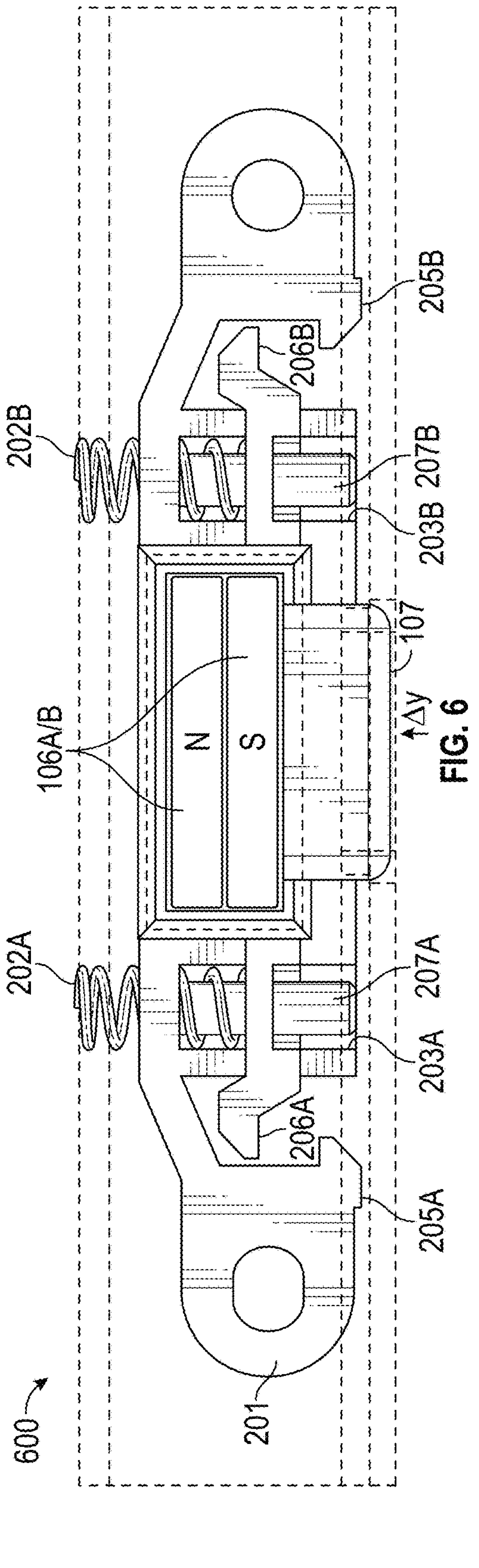
600
201
205B
206B
202B
207B
203B
107
106A/B
N
S
Δy
202A
207A
203A
206A
205A

FIG. 6

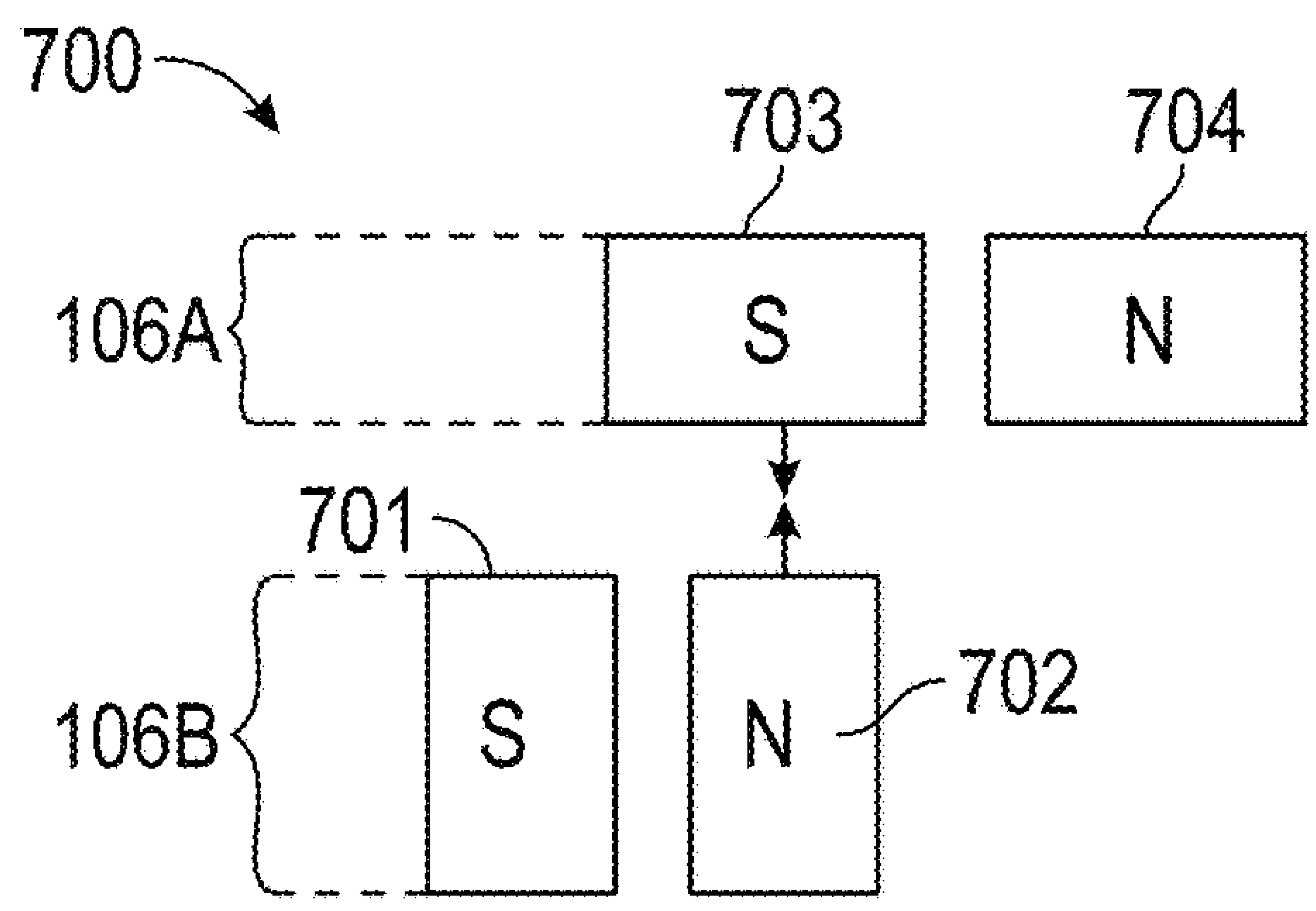

FIG. 7

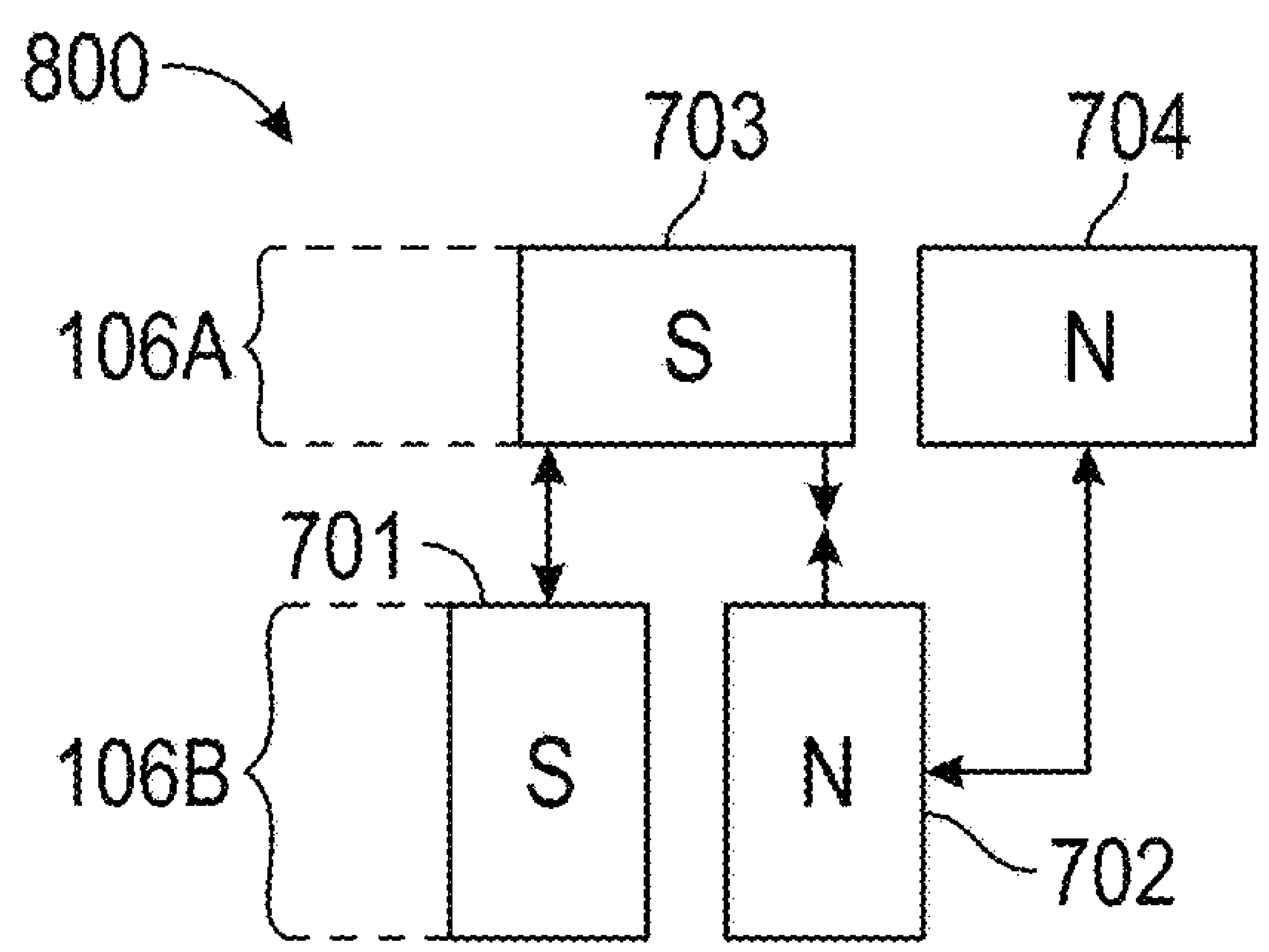

FIG. 8

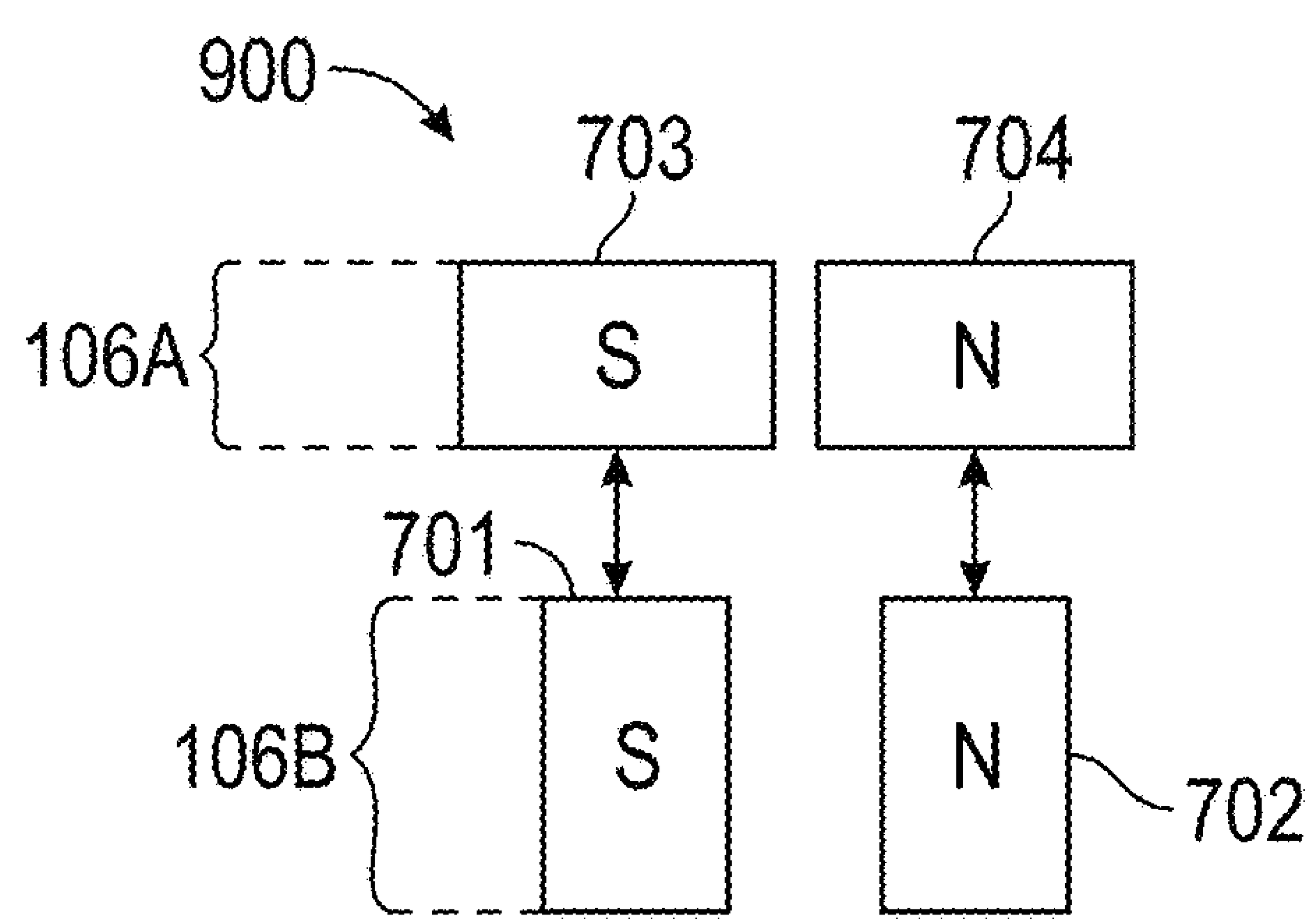

FIG. 9

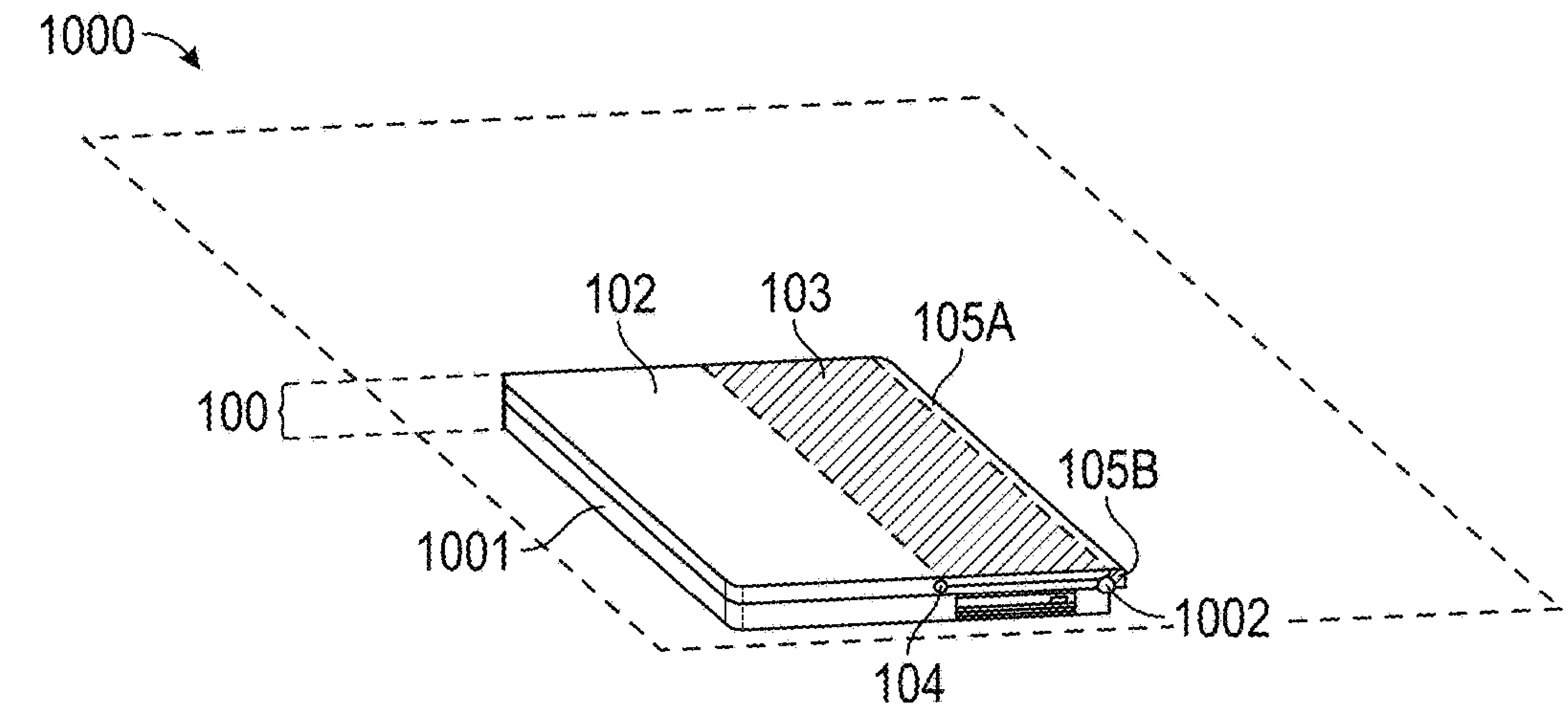

FIG. 10

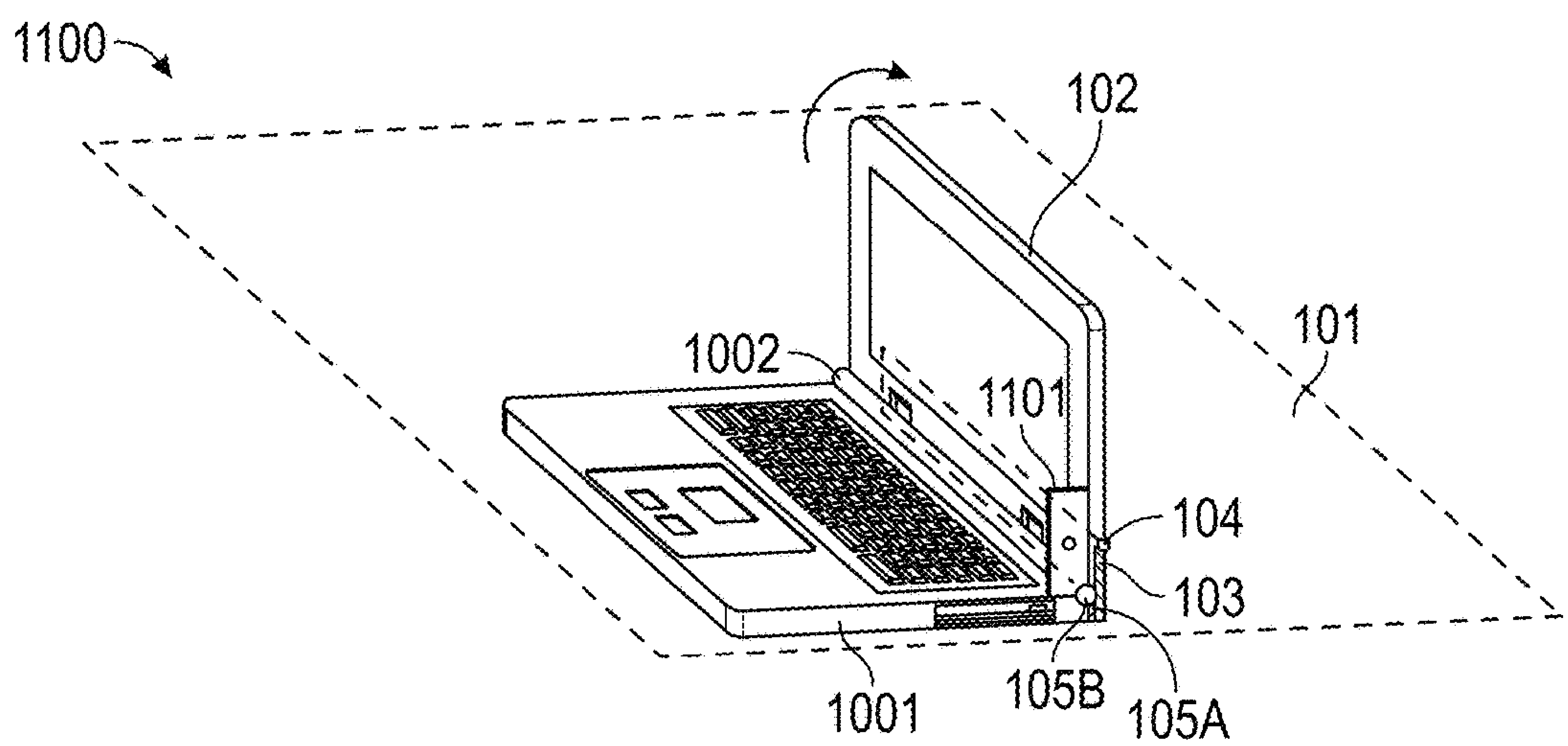

FIG. 11

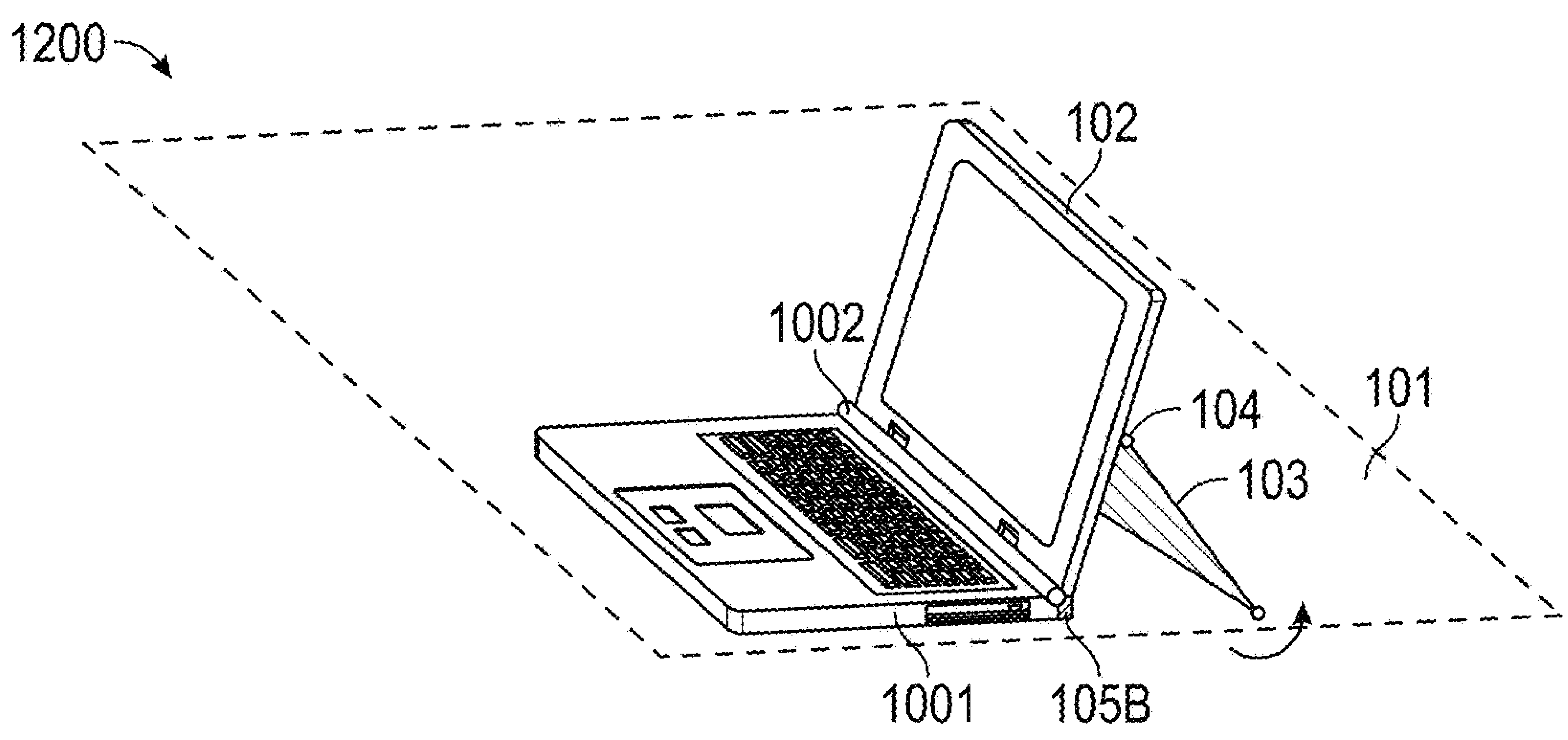

FIG. 12

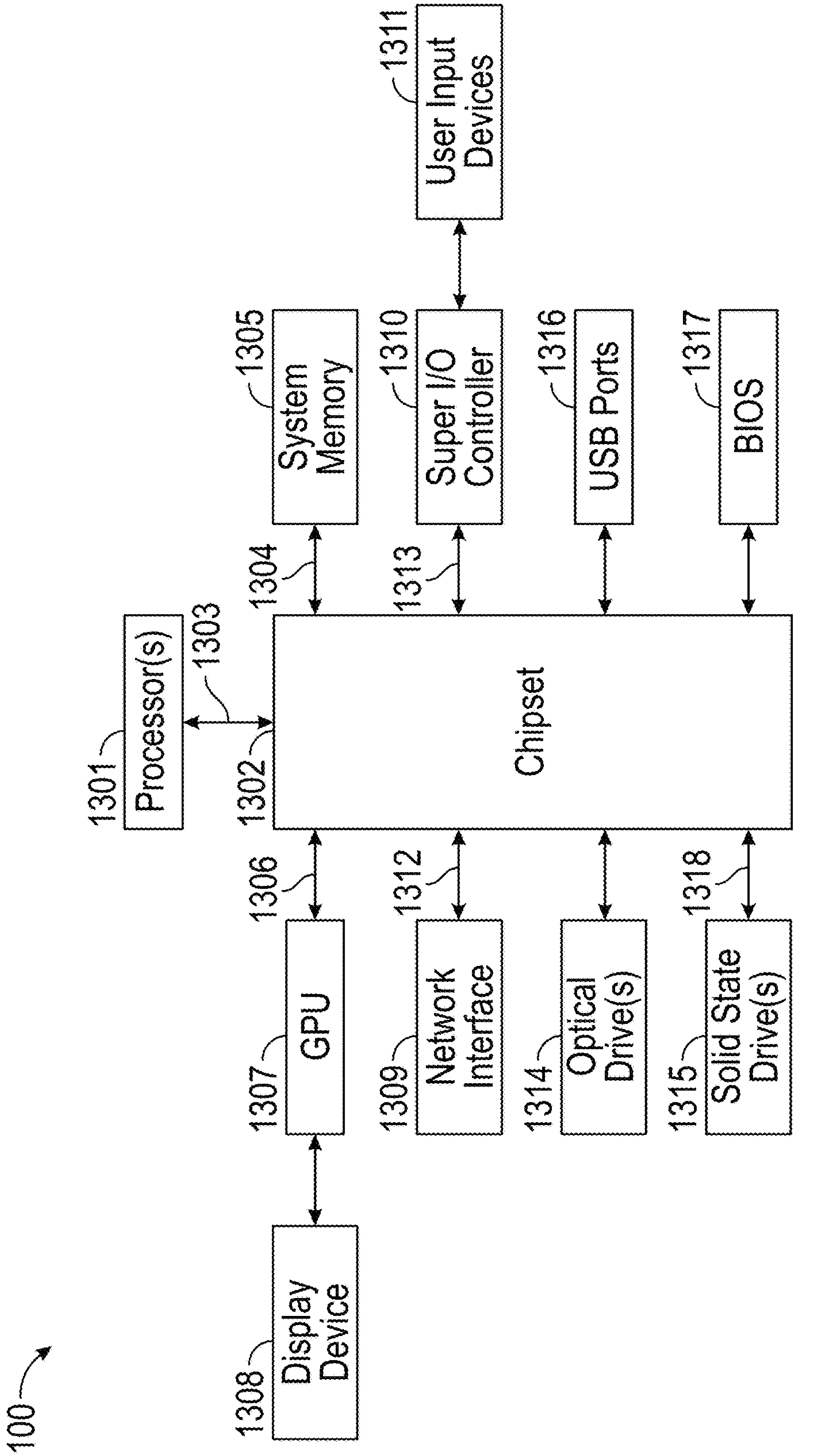
100
1301
Processor(s)
1303
1302
Chipset
1304
1305
System Memory
1313
1310
Super I/O Controller
1311
User Input Devices
1316
USB Ports
1317
BIOS
1306
1307
GPU
1308
Display Device
1312
1309
Network Interface
1314
Optical Drive(s)
1318
1315
Solid State Drive(s)

FIG. 13

LATCH WITH MAGNETICALLY-ASSISTED OPERATION FOR INFORMATION HANDLING SYSTEMS (IHSS)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

This application is a reissue of, and claims the benefit of the filing date of, U.S. patent application Ser. No. 15/730,166, filed on Oct. 11, 2017, now U.S. Pat. No. 10,495,254, titled "LATCH WITH MAGNETICALLY-ASSISTED OPERATION FOR INFORMATION HANDLING SYSTEMS (IHSs)," the disclosure of which is hereby incorporated by reference herein in its entirety.

FIELD

The present disclosure generally relates to information handling systems, and, more particularly, to a latch with magnetically-assisted operation for information handling systems.

BACKGROUND

As the value and use of information continues to increase, individuals and businesses seek additional ways to process and store information. One option available to users is information handling systems. An information handling system generally processes, compiles, stores, and/or communicates information or data for business, personal, or other purposes thereby allowing users to take advantage of the value of the information. Because technology and information handling needs and requirements vary between different users or applications, information handling systems may also vary regarding what information is handled, how the information is handled, how much information is processed, stored, or communicated, and how quickly and efficiently the information may be processed, stored, or communicated. The variations in information handling systems allow for information handling systems to be general or configured for a specific user or specific use such as financial transaction processing, airline reservations, enterprise data storage, or global communications. In addition, information handling systems may include a variety of hardware and software components that may be configured to process, store, and communicate information and may include one or more computer systems, data storage systems, and networking systems.

In various implementations, an information handling system may include a "kickstand" or the like. In general terms, a kickstand is an accessory or device that supports or otherwise props up an information handling system, so a user does not generally have to hold the device during its operation. In many cases, a kickstand may be a stand-alone product, a distinct product (e.g., a protective case), or integral part of the information handling system's chassis.

With respect to kickstands, the inventors hereof have determined that it would be desirable, for example, to deploy a spring-loaded kickstand that remains in a stowed or closed position when not in use, that allows a user to automatically deploy or open the kickstand when needed, and/or that

allows the user to manually trigger the kickstand without damage. To address these, and other issues, the inventors hereof have developed latches that operate with magnetic assistance, as described herein.

SUMMARY

Embodiments of a latch with magnetically-assisted operation are described. In an illustrative, non-limiting embodiment, a latch may include: a first magnetic device fixedly coupled to a first portion of an Information Handling System (IHS); a second magnetic device coupled to a movable second portion of the IHS; and a carrier, comprising: a compression bracket fixedly coupled to the first portion of the IHS, the compression bracket having a slot configured to accommodate the second magnetic device, at least one guidepost configured to receive a return spring, and at least one stopping pin; and a actuator bracket coupled to a movable compression bracket, the actuator bracket having a button configured to translate the second magnetic device with respect to the first magnetic device, at least one orifice configured to engage with the at least one guidepost, and at least one detent configured to engage with the at least one stopping pin.

In some implementations, the first magnetic device and the second magnetic device may have a same polarity orientation along a common axis. The first magnetic device may translate along the common axis in response to operation of the button.

When the actuator bracket is in a first position, the first magnetic device and the second magnetic device may interact under a predominantly attractive force. For example, when the actuator bracket is in the first position, a first portion of the first magnetic device having a first polarity may be aligned in a direction perpendicular to the common axis with a first portion of the second magnetic device having a second polarity opposite the first polarity.

When the actuator bracket is in a second position, the first magnetic device and the second magnetic device may interact under a predominantly repulsive force. For example, when the actuator bracket is in the second position: (i) a first portion of the first magnetic device having a first polarity may be aligned in a direction perpendicular to the common axis with a second portion of the second magnetic device having a second polarity opposite the first polarity, and (ii) a second portion of the first magnetic device having the second polarity may be aligned in the direction perpendicular to the common axis with a first portion of the second magnetic device having the first polarity.

In some cases, the second portion of the IHS may include a kickstand. The actuator bracket may be operated in response to physical contact of the actuator with a surface perpendicular to the first portion.

The second portion of the IHS may be coupled to the first portion via a spring-loaded hinge. The first portion of the IHS may include one or more clamping magnets, and the second portion of the IHS may include a corresponding set of one or more clamping magnets.

When the first magnetic device is in a first position along the common axis, forces applied to the second portion by the spring-loaded hinge may be smaller than a sum of: (i) attractive forces between the first and second magnetic devices, and (ii) attractive forces between the clamping magnets. When the first magnetic device is in a second position along the common axis, the attractive forces between the clamping magnets may be equal to a sum of: (i) the forces applied to the second portion by the spring-loaded hinge, and (ii) repulsive forces between the first and second magnetic devices. Wherein when the first magnetic device is in a third position along the common axis, the attractive forces between the clamping magnets may be smaller than a sum of: (i) repulsive forces between the first and second magnetic devices, and (ii) the forces applied to the second portion by the spring-loaded hinge.

In some cases, the second distance may be zero. At least one of the first or second magnetic devices includes an electromagnetic coil.

In another illustrative, non-limiting embodiment, a carrier may include an actuator bracket having a button configured to translate a second magnet movably coupled to an IHS with respect to a first magnetic device fixedly coupled to a kickstand, where the actuator bracket further includes: at an orifice configured to engage with a guidepost, and a detent configured to engage with a stopping pin; and a compression bracket fixedly coupled to the IHS, wherein the compression bracket further includes: a slot configured to accommodate the second magnet, the guidepost, and the stopping pin, wherein the guidepost is configured to receive a return spring.

In yet another illustrative, non-limiting embodiment, a method may include operating an actuator of a carrier coupled to a chassis of an IHS, where the carrier holds a first magnet that is movable relative to the chassis by operation of the actuator; and supporting at least a portion of the IHS using a kickstand coupled to the chassis, wherein the kickstand holds a second magnet fixed relative to the kickstand.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention(s) is/are illustrated by way of example and is/are not limited by the accompanying figures. Elements in the figures are illustrated for simplicity and clarity, and have not necessarily been drawn to scale.

FIG. **1** is a perspective view of an example of a latch with magnetically-assisted operation according to some embodiments.

FIG. **2** is an exploded view of latch components and magnet carrier, according to some embodiments.

FIG. **3** is a perspective view of assembled latch components and magnet carrier, according to some embodiments.

FIG. **4** is a lateral view of the assembled latch components and magnet carrier, according to some embodiments.

FIGS. **5** and **6** are top views of the assembled latch components in a home configuration and in a depressed configuration, respectively, according to some embodiments.

FIGS. **7-9** are block diagrams illustrating the magnetically-assisted operation of the example latch according to some embodiments.

FIGS. **10-12** are perspective views illustrating an example application of the latch in an information handling system (IHS) to some embodiments.

FIG. **13** is a block diagram illustrating example components of the IHS according to some embodiments.

DETAILED DESCRIPTION

Embodiments described herein comprise a latch with magnetically-assisted operation. In various implementations, systems and methods to concealably retain a spring loaded kickstand using multiple sets of magnets and latch mechanisms are provided. A user actuates the latch mechanism causing the kickstand and latch magnet's polarity to match, thus generating a repelling force that allows the kickstand to automatically deploy. The user may also manually open the kickstand without damage to the system.

In some embodiments, a system may include a kickstand assembly and a chassis or housing assembly with integrated latches. Single or multiple sets of magnets may be attached to the kickstand and concealed from view. Single or multiple sets of latch mechanisms may be installed into the chassis or housing, also concealed from view. The latch may include two or more magnets that are installed with the same (or opposite) polarity orientation into a carrier with a button/foot geometry that is exposed on the outside of the assembly.

When the kickstand is stowed away, the magnetic retention force between the kickstand magnets and latch magnets (in locked position) is higher than the kickstand spring opening force, therefore locking the kickstand in position. The user may then presse the system down against a surface to actuate the latch's buttons/feet. When actuated, the button/foot causes the latch magnets to shift or translate, thus causing the polarities between the kickstand and latch magnets to match. This matching polarity in turn generates a repelling force that allows the kickstand to automatically deploy.

In some cases, because the latch generates a repelling force, additional sets of magnets may be used to increase the kickstand to housing retention force, thus creating a more stable attachment (better retention when deployment is not wanted) when needed. The combination of magnets results in a balanced system when in the closed position, and in an unbalanced system when the kickstand is deployed.

In some cases, the user may manually actuate the kickstand without triggering the latch. This may be accomplished, for example, by manually pulling on one side of the kickstand to overcome the magnetic attachment.

In various embodiments, systems and methods described herein may be employed to produce a break-safe latch where the latch mechanism is not damaged if the kickstand is accidentally pulled apart. Both the kickstand magnets and latch mechanisms may be concealed in a compact design that has a minimal impact to the system's internal volume. Moreover, systems and methods described herein may also preserve the integrity of the work surface that the IHS is placed on, since it does not use exposed hooks or latches at the lower edge of the kickstand where the IHS would ordinarily sit on a table or desk (exposed hooks or latches may scratch/damage the work surface when the kickstand is deployed over larger open angles).

To illustrate the foregoing, FIG. **1** shows a perspective view of an example of latch **105** with magnetically-assisted operation. In some embodiments, information handling system (IHS) **100** may be disposed on horizontally (X-Y) surface **101**. IHS **100** may include chassis **102** and kickstand **103**. Chassis **102** includes chassis latch portion **105**B and kickstand **103** includes kickstand latch portion **105**A (collectively referred to as latch **105**). Kickstand **103** may be coupled to chassis **102** via hinge **104**, which may be a spring-loaded hinge or the like.

Magnetic devices **106**A and **106**B, **108**A and **108**B, and **108**C and **108**D, interact with each other (attraction and repulsion) under influence of their respective magnetic fields. In some cases, one or more of magnetic devices **106**A-D may be implemented as neodymium magnets (e.g., grade "N48"), may include one or more magnets, and/or may include poly-magnets and/or programmable magnets. Moreover, in various implementations, magnet size may be adjusted to meet various IHS form factors, geometries, electrical requirements, and/or weight considerations.

As illustrated, magnetic devices **108**A and **108**B have opposite polarity (in this example, south or "S" and north or "N", respectively), as do magnetic devices **108**C and **108**D (S and N, respectively). In contrast, magnetic device **106**A has a first polarity orientation in the Y direction (S-N in this case), while magnetic device **106**B has an opposite polarity orientation in the Y direction (N-S).

In alternative embodiments, however, magnetic devices **106**A and **106**B may have the same polarity orientation in the Y axis using techniques described herein, with minor modifications that would be readily apparent to a person of ordinary skill in the art in light of this disclosure.

In various implementations, magnetic devices **108**A-D ("clamping magnets") may be used to provide a larger overall clamping force when kickstand **103** is stowed or closed with respect to chassis **102**. To this end, magnetic devices **108**A and **108**C may be fixed or stationary relative to kickstand **103**. Conversely, magnetic devices **108**B and **108**D may also be fixed or stationary relative to chassis **102**. That is, chassis **102** includes, is coupled to, and/or accommodates magnetic devices **108**B and **108**D.

Magnetic device **106**A is also fixed or stationary with respect to kickstand **103**; however, magnetic device **106**B is allowed to travel in the Y direction relative to chassis **102** under control of actuator **107**. Moreover, the magnitude and/or nature of the magnetic interactions between magnetic devices **106**A and **106**B vary over time as actuator **107** physically moves magnetic device **106**B such that the position of magnetic device **106**B changes relative to chassis **102**, to enable magnetic-assisted operation of latch **105**.

FIG. **2** is an exploded view of latch components **200** and carrier **201**. As noted above, kickstand **103** includes and/or is coupled to magnetic device **106**A (clamping magnets are omitted for simplicity), and chassis **102** includes, accommodates, and/or is coupled to magnetic device **106**B.

In this embodiment, carrier **201** includes compression bracket **210** and actuator bracket **204**. Compression bracket **210** includes first guidepost **207**A, second guidepost **207**B, first detent **205**A, second detent **205**B, and surface **208**. First guidepost **207**A and second guidepost **207**B are configured to receive first return spring **202**A and second return spring **202**B, respectively. In various implementations, first return spring **202**A and second return spring **202**B may be coil springs with diameters and lengths larger than guideposts **207**A and **207**B, such that actuator bracket **204** applies an outward force against either the detents of the compression bracket or the chassis, depending on the design.

Actuator bracket **204** includes actuator **107** (e.g., a mechanical push button) first orifice **203**A and second orifice **203**B, first stopping pin **206**A and second stopping pin **206**B. In various implementations, first orifice **203**A may have a diameter between the diameter of first return spring **202**A and first guidepost **[202**A**]** *207A*. Similarly, second orifice **203**B may have a diameter between the diameter of second return spring **[202**B**]** *207B* and second guidepost **[202**B**]** *207B*. First and second stopping pins **206**A-B have a shape configured to match the shape of detents **205**A-B and to limit the amount of traveling or translation. that actuator bracket **[210]** *204* is allowed to have.

When compression bracket **210** is coupled to actuator bracket **204**, actuator bracket **204** becomes operable to slide in and out of guideposts **207**A-B when actuator **107** is pressed (e.g., directly by a user or against a surface), against opposing forces presented by return springs **202**A-B. When actuator **107** is no longer pressed, return springs **202**A-B cause actuator bracket **204** to return to its default position, as stopping pins **206**A-B engage with detents **205**A-B.

FIG. **3** shows latch components **200** and carrier **201** in assembled form**[300]**, according to some embodiments. Assembled components **[300]** include actuator **107** in its initial, "home," or "rest" position, such that magnetic devices **106**A and **106**B are offset from one another in the Y direction by a selected distance. As a result, a first portion of magnetic device **106**A that has a uiven polarity (e.g., S) sits immediately above a first portion of magnetic device **1.0613** having opposing polarity (e.g., N). A second portion of magnetic device **106**A sits above a groove or channel in chassis **102** that allows magnetic device **106**B to travel in the Y direction. Finally, a second portion of magnetic device **106**B sits under a plain surface of kickstand **103**.

FIG. **4** is a lateral view of latch components **200** and carrier **201**, and illustrates a gap **401** in the Z-direction between magnetic devices **106**A and **106**B. In some cases, gap **401** may be of the order of 0.7 mm and/or it may be adjustable (e.g., via hinge **104**) to empirically adjust magnetic forces among the various magnetic devices.

FIG. **5** is a top view of assembled components **[300]** in home configuration **500** when kickstand **103** is either fully open or closed, in the absence of activation of actuator **107**. FIG. **6** is a top view of assembled components **[300]** in depressed configuration **600** when kickstand **103** is activated via, actuator **107**. The transitions among the various different configurations are explained in more detail in FIGS. **7**-**9**.

Broadly, magnets in the chassis attract corresponding magnets in the kickstand when in home configuration **500**. Conversely, magnets in the chassis translate when a button is depressed, resulting in a repulsion force for corresponding magnets in kickstand and therefore aiding in the opening of the kickstand (e.g., easier to open, faster opening action, etc.).

FIGS. **7**-**9** are block diagrams illustrating the magnetically-assisted operation of latch **105** according to some embodiments. Particularly, stage **700** corresponds to home configuration **500** and stage **900** corresponds to depressed configuration **600**. Stage **800** is an intermediate stage reached during operation of latch **105** as it opens to deploy kickstand **103**.

In stage **700**, portion **701** of magnetic device **106**B sits below a plain portion of kickstand **103**, portion **702** of magnetic device **106**B sits below portion **703** of magnetic device **106**A, and portion **704** of magnetic device **106**A sits above a plain portion of chassis **102**. The dominant force in this configuration is an attractive force between portions **702** and **703**, which operates to maintain kickstand **103** closed (alongside forces provided by any clamping magnets **108**A-D) against repelling forces between portions **701** and **703**, and between **702** and **704** (alongside forces provided by spring-loaded hinge **104**).

Stage **800** is reached in response to actuator **107** being activated to cause magnetic device **106**B to translate in the Y direction with respect to magnetic device **106**A. In this state of unstable equilibrium, a balance is reached such that: the attractive force between portions **702** and **703** (in conjunction with any clamping magnets **108**A-D) is approximately equal in magnitude to an opposing force that is the sum of: (a) repelling forces between portions **701** and **703**, and (b) repelling forces between **702** and **704** (in conjunction with any forces applied by spring-loaded hinge **104**).

In stage **900**, actuator **107** is at is maximum travel distance, such that magnetic device **106**A is immediately above magnetic device **106**B. In this state, repelling forces between portions **701** and **703**, and between **702** and **704** (in conjunction with any forces applied by spring-loaded hinge **104**) dominate any attractive forces between portions **701** and **704**, or between portions **702** and **703** (in conjunction with any forces applied by clamping magnets **108**A-D).

Still referring to FIGS. **7-9**, it should be noted that, in many cases, the opening of kickstand **103** begins to take place immediately after stage **800**, when gap **401** begins to increase. Hence, in these cases, stage **900** may not be reached and/or it may not be necessary to provide opening assistance of kickstand **103**.

FIGS. **10-12** are perspective views illustrating an application of latch **105** in IHS **100** to some embodiments. In this example, IHS **100** is integrated into a laptop or tablet device having IHS portion **1001** coupled to chassis or lid **102**, for instance, via coupler **1002** (e.g. a hinge with guideposts and/or electrical terminals, such as pogo pins or the like).

In some cases, IHS portion **1001** may include a processor and/or other IHS components, whereas chassis **[200]** *102* may house a liquid crystal display (LED) or the like. In other cases, IHS portion **1001** may be a keyboard or docking station, and chassis **[200]** *102* may house a touch screen or tablet device.

As previously discussed, chassis **102** may be coupled to kickstand **103** via spring-loaded hinge **104**. Kickstand **103** may include kickstand latch portion **105**A and chassis **102** may include chassis latch portion **105**B.

When in state **1000**, IHS portion **1001** sits closed horizontally on surface **101**. Then, in state **1100**, a user manipulates and opens chassis **102** away from IHS portion **1001** around coupler **1002** such that the rear portion of latch **105**B touches surface **101** and therefore begins to activate actuator **107** (at any selected activation angle **1101**—e.g., 90°). In state **1200**, as actuator **107** becomes depressed against surface **101**, magnetic device **106**B translates with respect to magnetic device **106**A, thus magnetically assisting in the opening of kickstand **103**. Once opened, kickstand **103** helps to support IHS **100** against surface **101**.

In some embodiments, the size, number, and position of the various components described herein may be selected empirically without undue experimentation. For example, in some cases, the following specifications may be used to manufacture the aforementioned systems: magnet material=N42; magnet size=2 mm×12 mm×1 mm on the kickstand side and 2 mm×12 mm×3.2 mm on the chassis side; magnet quantity (kickstand)=2; magnet quantity (chassis)=2; Z-gap or distance=0.7 mm; holding force per latch=99 gf; total holding force=198 gf.

For purposes of this disclosure, an IHS may include any instrumentality or aggregate of instrumentalities operable to compute, calculate, determine, classify, process, transmit, receive, retrieve, originate, switch, store, display, communicate, manifest, detect, record, reproduce, handle, or utilize any form of information, intelligence, or data for business, science, control, or other purposes. For example, an IHS may be a personal computer (e.g., desktop or laptop), tablet computer, mobile device (e.g., personal digital assistant (PDA) or smart phone), server (e.g., blade server or rack server), a network storage device, or any other suitable device and may vary in size, shape, performance, functionality, and price. The IHS may include random access memory (RAM), one or more processing resources such as a central processing unit (CPU) or hardware or software control logic, ROM, and/or other types of nonvolatile memory. Additional components of the IHS may include one or more disk drives, one or more network ports for communicating with external devices as well as various input and output (I/O) devices, such as a keyboard, a mouse, touchscreen and/or a video display. The IHS may also include one or more buses operable to transmit communications between the various hardware components.

FIG. **13** illustrates example components of IHS **100** according to some embodiments. As shown, IHS **100** includes one or more processors **1301**. In various embodiments, IHS **100** may be a single-processor system including one processor **1301**, or a multi-processor system including two or more processors **1301**. Processor(s) **1301** may include any processor capable of executing program instructions, such as any general-purpose or embedded processor implementing any of a variety of Instruction Set Architectures (ISAs).

IHS **100** comprises chipset **1302** that may include one or more integrated circuits that are connected to processor(s) **1301**. In certain embodiments, chipset **1302** may utilize QPI (QuickPath Interconnect) bus **1303** for communicating with the processor(s) **1301**. Chipset **1302** provides processor(s) **1301** with access to a variety of resources. For instance, chipset **1302** provides access to system memory **1305** over memory bus **1304**. System memory **1305** may be configured to store program instructions and/or data accessible by processors(s) **1301**. In various embodiments, system memory **1305** may be implemented using any suitable memory technology, such as static RAM (SRAM), dynamic RAM (DRAM) or nonvolatile/Flash-type memory.

Chipset **1302** may also provide access to Graphics Processing Unit (GPU) **1307**. In certain embodiments, graphics processor **1307** may part of one or more video or graphics cards that have been installed as components of IHS **100**. Graphics processor **1307** may be coupled to the chipset **1302** via graphics bus **1306** such as provided by an AGP (Accelerated Graphics Port) bus or a PCIe (Peripheral Component Interconnect Express) bus. In certain embodiments, GPU **1307** generates display signals and provides them to display device **1308**.

In certain embodiments, chipset **1302** may also provide access to one or more user input devices **1311**. In such embodiments, chipset **1302** may be coupled to a super I/O controller **1310** that provides interfaces for a variety of user input devices **1311**, in particular lower bandwidth and low data rate devices.

For instance, super I/O controller **1310** may provide access to a keyboard and mouse or other peripheral input devices. In certain embodiments, super I/O controller **1310** may be used to interface with coupled user input devices **1311** such as keypads, biometric scanning devices, and voice or optical recognition devices. These I/O devices may interface with super I/O controller **1310** through wired or wireless connections. In certain embodiments, chipset **1302** may be coupled to super I/O controller **1310** via Low Pin Count (LPC) bus **1313**.

Other resources may also be coupled to processor(s) **1301** of IHS **100** through chipset **1302**. In certain embodiments, chipset **1302** may be coupled to a network interface **1309**, such as provided by a Network Interface Controller (NIC) that is coupled to IHS **100**. In certain embodiments, network interface **1309** may be coupled to chipset **1302** via PCIe bus **1312**. According to various embodiments, network interface **1309** may also support communication over various wired and/or wireless networks and protocols (e.g., Wi-Fi, Bluetooth, etc.). In certain embodiments, chipset **1302** may also provide access to one or more Universal Serial Bus (USB) ports **1316**.

Chipset **1302** also provides access to one or more solid state storage devices **1315** using PCIe bus interface connection **1318**. In certain embodiments, chipset **1302** may also provide access to other types of storage devices. For instance, in addition to solid state storage device **1315**, IHS **100** may also utilize one or more magnetic disk storage devices, or other types of the storage devices such as optical drive(s) **1314** or a removable-media drive. In various embodiments, solid state storage device **1315** may be integral to IHS **100**, or may be located remotely from IHS **100**.

Upon powering or restarting IHS **100**, processor(s) **1301** may utilize instructions stored in Basic Input/Output System (BIOS) or Unified Extensible Firmware Interface (UEFI) chip **1317** to initialize and test hardware components coupled to IHS **100** and to load an Operating System (OS) for use by IHS **100**. Generally, BIOS **1317** provides an abstraction layer that allows the OS to interface with certain hardware components that utilized by IHS **100**. It is through this hardware abstraction layer that software executed by the processor(s) **1301** of IHS **100** is able to interface with I/O devices that coupled to IHS **100**.

In various embodiments, IHS **100** may not include each of the components shown in FIG. **13**. Additionally or alternatively, IHS **100** may include various components in addition to those that are shown. Furthermore, some components that are represented as separately may, in other embodiments, be integrated with other components. For example, in various implementations, all or a portion of the functionality provided by the illustrated components may instead be provided by components integrated into the one or more processor(s) **1301** as a system-on-a-chip (SOC) or the like.

It should be understood that various operations described herein may be implemented in software or software modules executed by logic or processing circuitry, hardware, or a combination thereof. The order in which each operation of a given method is performed may be changed, and various operations may be added, reordered, combined, omitted, modified, etc. It is intended that the invention(s) described herein embrace all such modifications and changes and, accordingly, the above description should be regarded in an illustrative rather than a restrictive sense.

Although the invention(s) is/are described herein with reference to specific embodiments, various modifications and changes can be made without departing from the scope of the present invention(s), as set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of the present invention(s). Any benefits, advantages, or solutions to problems that are described herein with regard to specific embodiments are not intended to be construed as a critical, required, or essential feature or element of any or all the claims.

Unless stated otherwise, terms such as "first" and "second" are used to arbitrarily distinguish between the elements that such terms describe. Thus, these terms are not necessarily intended to indicate temporal or other prioritization of such elements. The terms "coupled" or "operably coupled" are defined as connected, although not necessarily directly, and not necessarily mechanically. The terms "a" and "an" are defined as one or more unless stated otherwise. The terms "comprise" (and any form of comprise, such as "comprises" and "comprising"), "have" (and any form of have, such as "has" and "having"), "include" (and any form of include, such as "includes" and "including") and "contain" (and any form of contain, such as "contains" and "containing") are open-ended linking verbs. As a result, a system, device, or apparatus that "comprises," "has," "includes" or "contains" one or more elements possesses those one or more elements but is not limited to possessing only those one or more elements. Similarly, a method or process that "comprises," "has," "includes" or "contains" one or more operations possesses those one or more operations but is not limited to possessing only those one or more operations.

The invention claimed is:

1. [A latch] *An Information Handling System (IHS)*, comprising:

[a first magnetic device fixedly coupled to a first portion of an Information Handling System (IHS);

a second magnet coupled to a carrier magnetic device coupled to a movable second portion of the IHS; and

a carrier, comprising:

a compression bracket fixedly coupled to the first portion of the IHS, the compression bracket having a surface configured to accommodate the second magnetic device, at least one guidepost configured to receive a return spring, and at least one stopping pin; and

an actuator bracket coupled to the compression bracket, the actuator bracket having a button configured to translate the second magnetic device with respect to the first magnetic device, at least one orifice configured to engage with the at least one guidepost, and at least one detent configured to engage with the at least one stopping pin]

a chassis;

a kickstand coupled to the chassis; and

an assembly coupled to the chassis, wherein the assembly comprises a first magnetic device coupled to an actuator and a guidepost coupled to the actuator, wherein the actuator comprises a button, and wherein the actuator is configured to:

translate the first magnetic device from a first position to a second position with respect to a second magnetic device coupled to the kickstand; and

compress a spring having the guidepost inserted therein, wherein the guidepost is insertable into an orifice in the assembly through the spring, and wherein the spring is configured to return the first magnetic device to the first position.

2. The [latch] *IHS* of claim **1**, wherein the first magnetic device and the second magnetic device have a same polarity orientation.

[**3**. The latch of claim **1**, wherein the first magnetic device translates in response to operation of the button.]

4. The [latch] *IHS* of claim [**3**] *1*, wherein when the [actuator bracket] *first magnetic device* is in [a] *the* first position, the first magnetic device and the second magnetic device interact under a predominantly attractive force.

5. The [latch] *IHS* of claim **4**, wherein when the [actuator bracket] *first magnetic device* is in the first position, a first portion of the first magnetic device having a first polarity is aligned with a first portion of the second magnetic device having a second polarity opposite the first polarity.

6. The [latch] *IHS* of claim **4**, wherein when the [actuator bracket] *first magnetic device* is in [a] *the* second position, the first magnetic device and the second magnetic device interact under a predominantly repulsive force.

7. The [latch] *IHS* of claim **6**, wherein when the [actuator bracket] *first magnetic device* is in the second position: (i) a first portion of the first magnetic device having a first polarity is aligned with a second portion of the second magnetic device having a second polarity opposite the first polarity, and (ii) a second portion of the first magnetic device having the second polarity is aligned with a first portion of the second magnetic device having the first polarity.

[**8**. The latch of claim **3**, wherein the second portion of the IHS includes a kickstand.]

9. The [latch] *IHS* of claim [**8**] *1*, wherein the actuator [bracket] is operated in response to physical contact of the button [with] *of the actuator, wherein the button of the actuator comprises* a surface perpendicular to the [first portion] *guidepost*.

10. The [latch] *IHS* of claim [**3**] *1*, wherein the [second portion of the IHS] *kickstand* is coupled to the [first portion] *chassis* via a spring-loaded hinge.

11. The [latch] *IHS* of claim [**3**] *10*, wherein the [first portion of the IHS includes] *chassis comprises* one or more clamping magnets, and wherein the [second portion of the IHS includes] *kickstand comprises* a corresponding set of one or more clamping magnets.

12. The [latch] *IHS* of claim **11**, wherein when the first magnetic device is in [a] *the* first position, forces applied to the [second portion] *kickstand* by the spring-loaded hinge are smaller than a sum of: (i) attractive forces between the first and second magnetic devices, and (ii) attractive forces between the clamping magnets, wherein when the first magnetic device is in [a second] *an intermediate* position, the attractive forces between the clamping magnets are equal to a sum of: (i) the forces applied to the [second portion] *kickstand* by the spring-loaded hinge, and (ii) repulsive forces between the first and second magnetic devices, and wherein when the first magnetic device is in [a third] *the second* position, the attractive forces between the clamping magnets [is] *are* smaller than a sum of: (i) repulsive forces between the first and second magnetic devices, and (ii) the forces applied to the [second portion] *kickstand* by the spring-loaded hinge.

[**13**. The latch of claim **1**, wherein the second distance is zero.]

14. The [latch] *IHS* of claim **1**, wherein at least one of the first or second magnetic devices [includes] *comprises* an electromagnetic coil.

15. A*n assembly* carrier *coupled to an Information Handling System (IHS)*, comprising:

a first magnetic device;

an actuator [bracket] having a button configured to translate [a second] *the first* [movably coupled to an Information Handling System (IHS)] *magnetic device from a first position to a second position* with respect to a [first] *second* magnetic device [fixedly] coupled to a kickstand[, wherein the actuator bracket further comprises: at an orifice configured to engage with]*; and*

a guidepost [and a detent configured to engage with a stopping pin; and a compression bracket fixedly coupled to the IHS, wherein the compression bracket further comprises: a surface configured to accommodate the second magnet, the guidepost, and the stopping pin,] *coupled to the actuator,* wherein the guidepost is [inserted] *insertable* into *an orifice in the assembly carrier through* a return spring, *wherein the return spring is configured to be compressed when the first magnetic device is translated to the second position, and wherein the return spring is configured to return the first magnetic device from the second position to the first position*.

16. The *assembly* carrier of claim **15**, wherein the first magnet*ic device* and the second magnet*ic device* have a same polarity orientation, *and* wherein the first magnet*ic device* translates in response to operation of the [button] *actuator*.

17. The *assembly* carrier of claim **16**, wherein when the actuator [bracket] is in a first position, a first portion of the first magnet*ic device* having a first polarity is aligned with a first portion of the second magnet*ic device* having a second polarity opposite the first polarity, and the first magnet*ic device* and the second magnet magnet*ic device* interact under a predominantly attractive force.

18. The *assembly* carrier of claim **16**, wherein when the actuator is in a second position: (i) a first portion of the first magnet*ic device* having a first polarity is aligned with a second portion of the second magnet*ic device* having a second polarity opposite the first polarity, (ii) a second portion of the first magnet*ic device* having the second polarity is aligned with a first portion of the second magnet*ic device* having the first polarity, and (iii) the first magnet*ic device* and the second magnet*ic device* interact under a predominantly repulsive force.

19. A method, comprising:

operating an actuator of [a carrier] *an assembly* coupled to [a chassis of] an Information Handling System (IHS), wherein the [carrier holds] *assembly comprises* a first [magnet that is movable relative to the chassis by operation of the actuator] *magnetic device*; and

supporting at least a portion of the IHS using a kickstand[coupled to the chassis], wherein the kickstand [holds] *comprises* a second [magnet fixed relative to the kickstand] *magnetic device*, wherein the [chassis includes] *IHS comprises* one or more clamping magnets and the kickstand [includes] *comprises* a corresponding set of one or more clamping magnets, wherein when the first magnet*ic device* is in a first position, forces applied to the kickstand by a spring-loaded hinge coupling the kickstand to the [chassis] *IHS* are smaller than a sum of: (i) attractive forces between the first and second [magnets] *magnetic devices*, and (ii) attractive forces between the clamping magnets, wherein when the first magnet*ic device* is in a second position, the attractive forces between the clamping magnets are equal to a sum of: (i) the forces applied to the kickstand by the spring-loaded hinge, and (ii) repulsive forces between the first and second [magnets] *magnetic devices*, and wherein when the first magnet*ic device* is in a third position, the attractive forces between the clamping magnets is smaller than a sum of: (i) repulsive forces between the first and second [magnets] *magnetic devices*, and (ii) the forces applied to the kickstand by the spring-loaded hinge.

20. The method of claim 19, wherein the actuator is configured to: (a) translate the first magnetic device with respect to the second magnetic device; and (b) compress a return spring having a guidepost inserted therein.

21. The method of claim 20, wherein the guidepost is configured to travel with respect to an orifice in the assembly through the return spring.

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