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

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F16B 1/00; F16B 2001/0035; G06F 1/16;  
G06F 1/166; G06F 1/1616; G06F 1/1679;  
H01F 7/0205

See application file for complete search history.

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**Related U.S. Patent Documents**

Reissue of:

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Issued: **Dec. 3, 2019**  
Appl. No.: **15/730,166**  
Filed: **Oct. 11, 2017**

(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 an 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.

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**G06F 1/16** (2006.01)  
**F16M 11/10** (2006.01)  
**F16B 1/00** (2006.01)

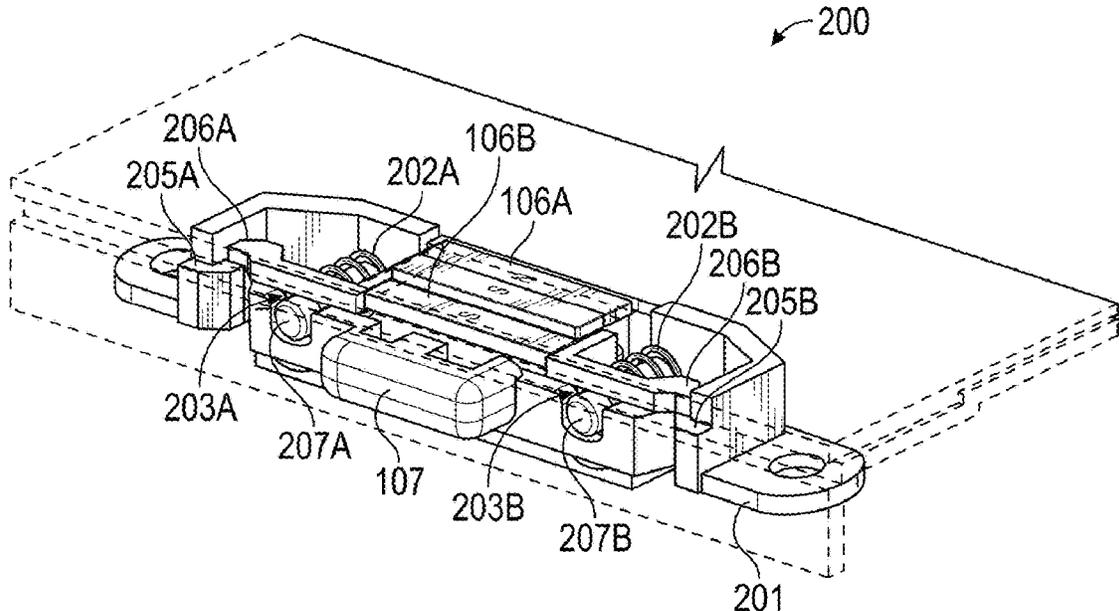
(52) **U.S. Cl.**

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(58) **Field of Classification Search**

CPC ..... F16M 13/00; F16M 13/005; F16M 13/05;

**18 Claims, 7 Drawing Sheets**



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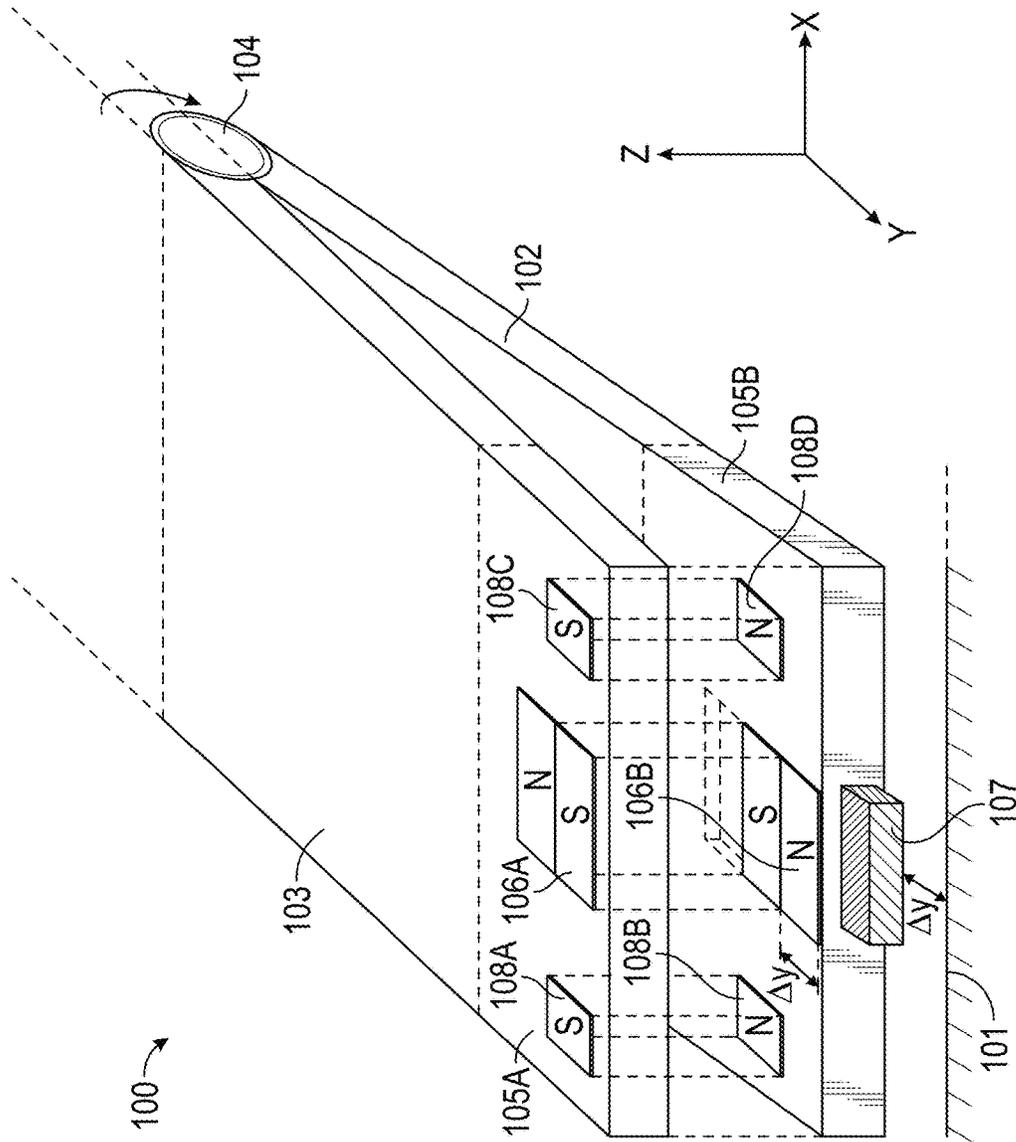


FIG. 1

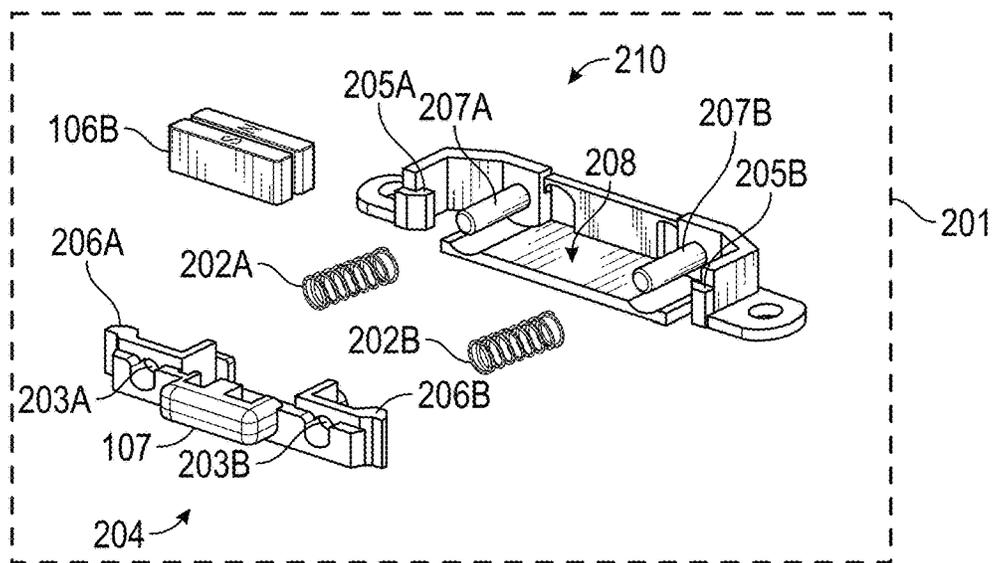
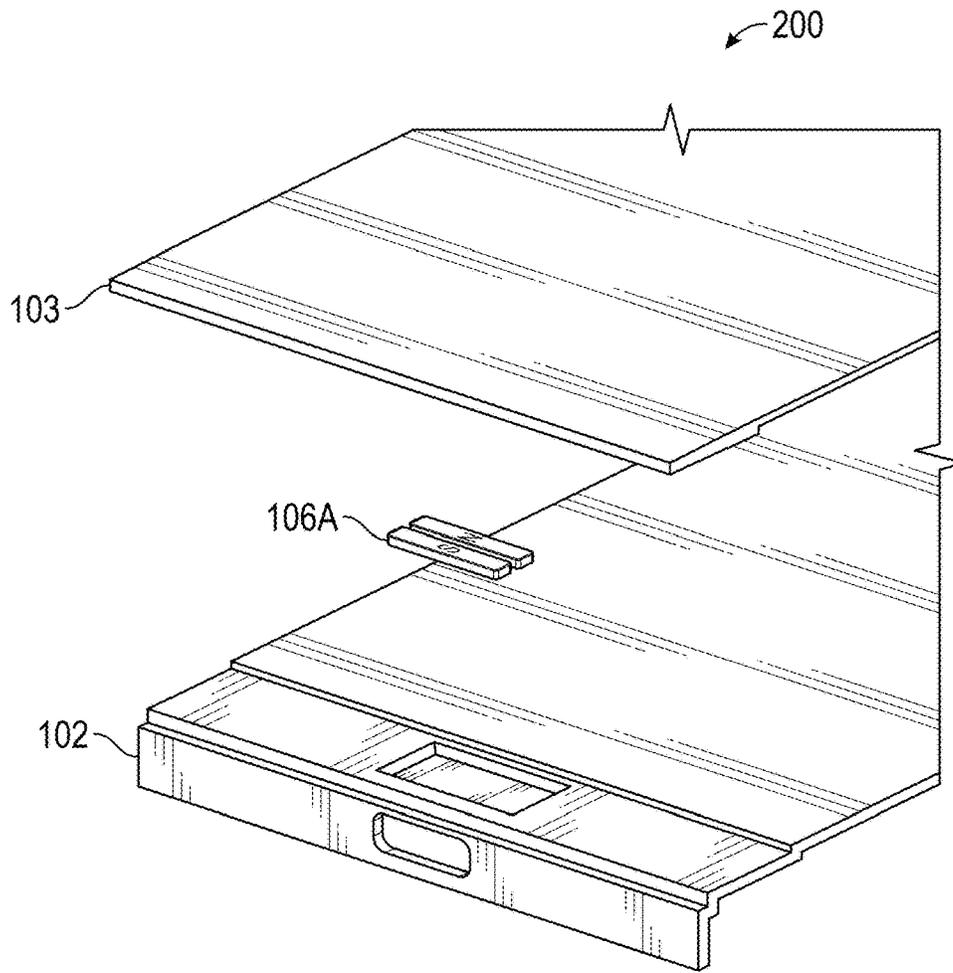


FIG. 2

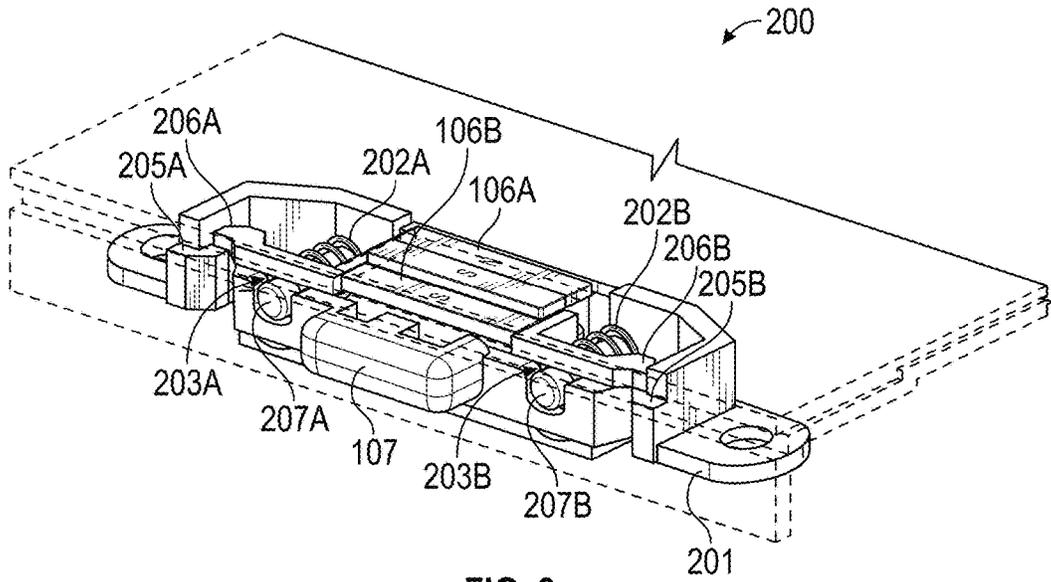


FIG. 3

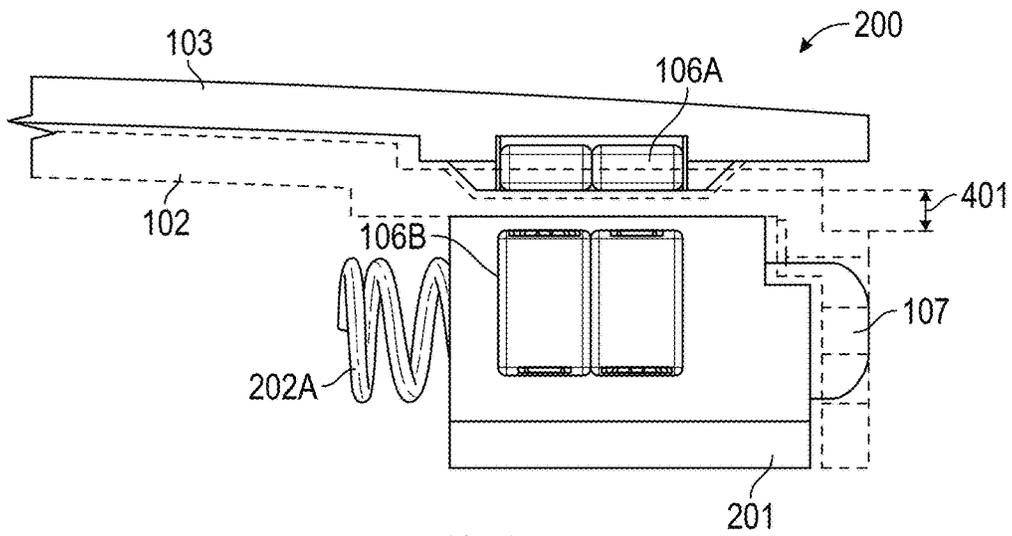
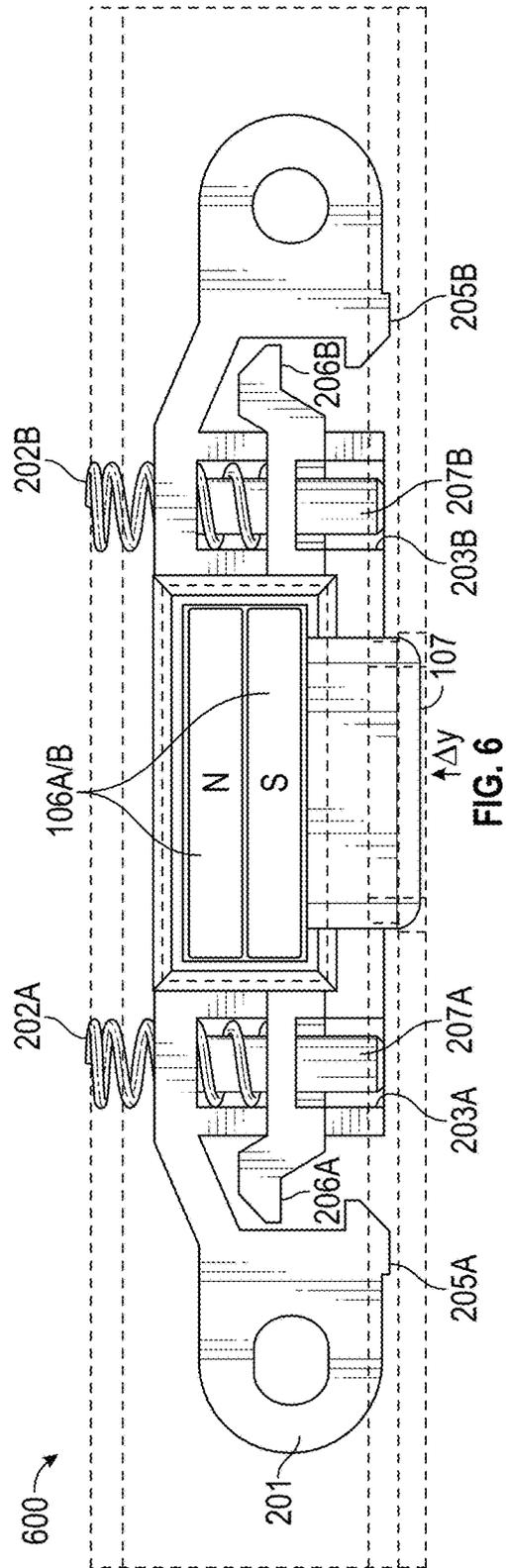
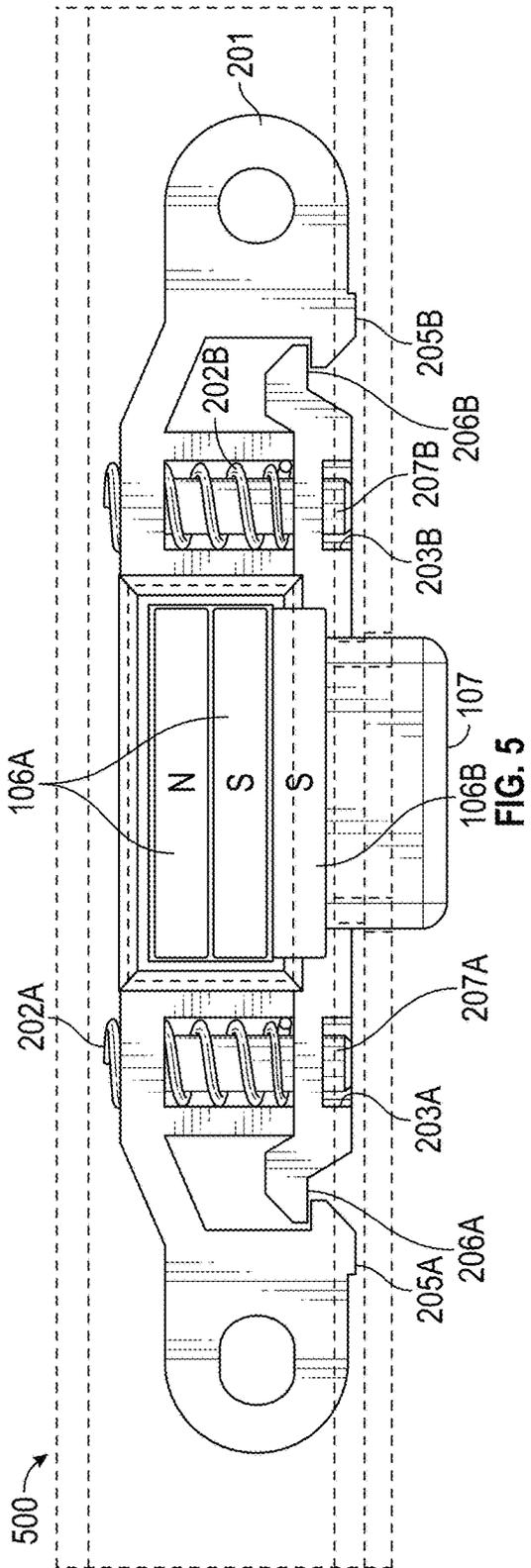


FIG. 4



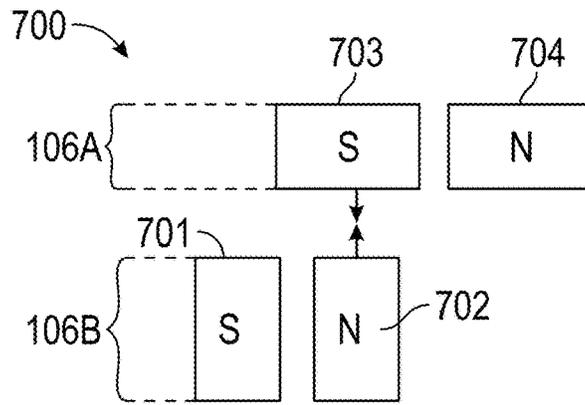


FIG. 7

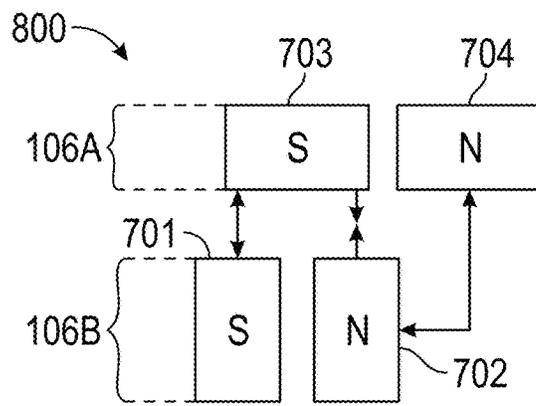


FIG. 8

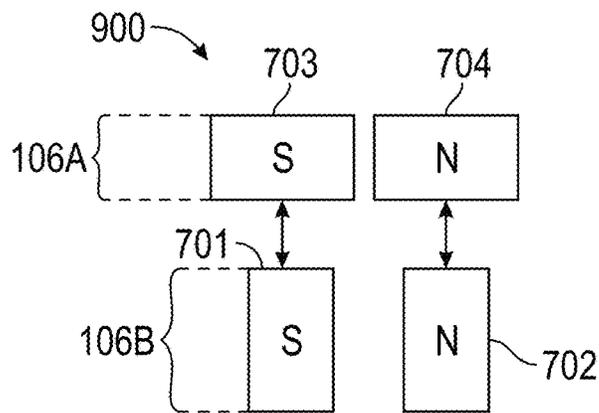


FIG. 9

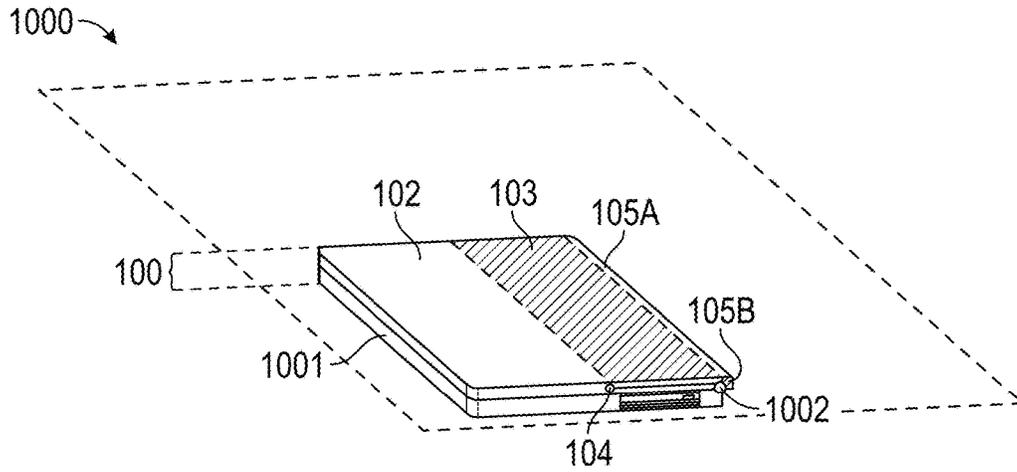


FIG. 10

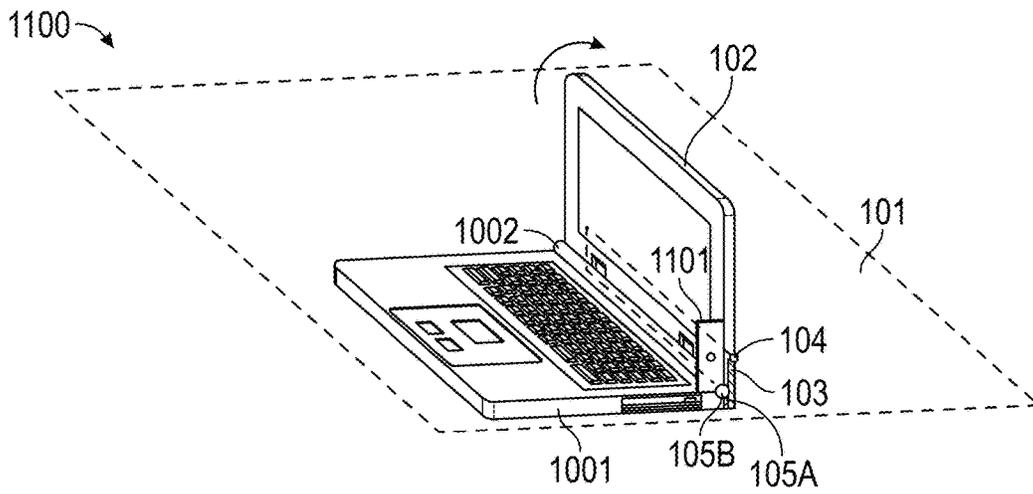


FIG. 11

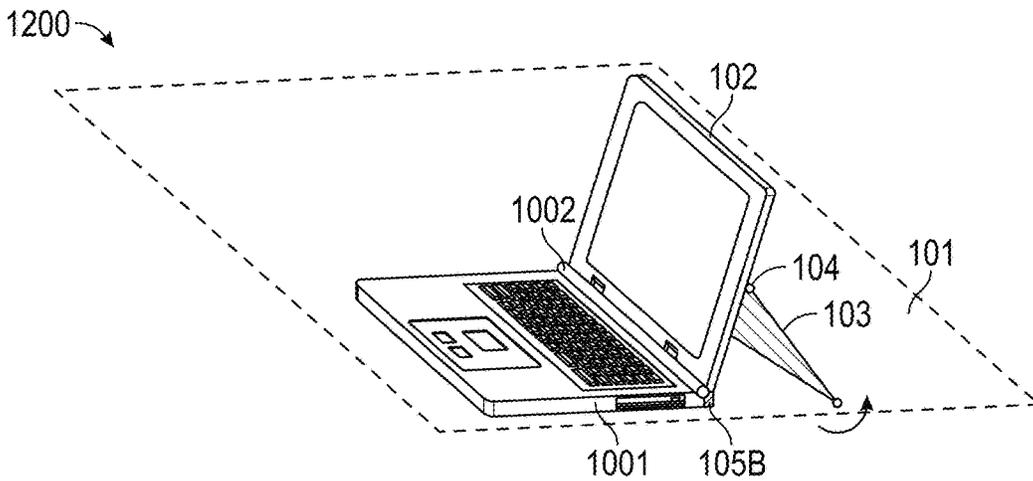


FIG. 12

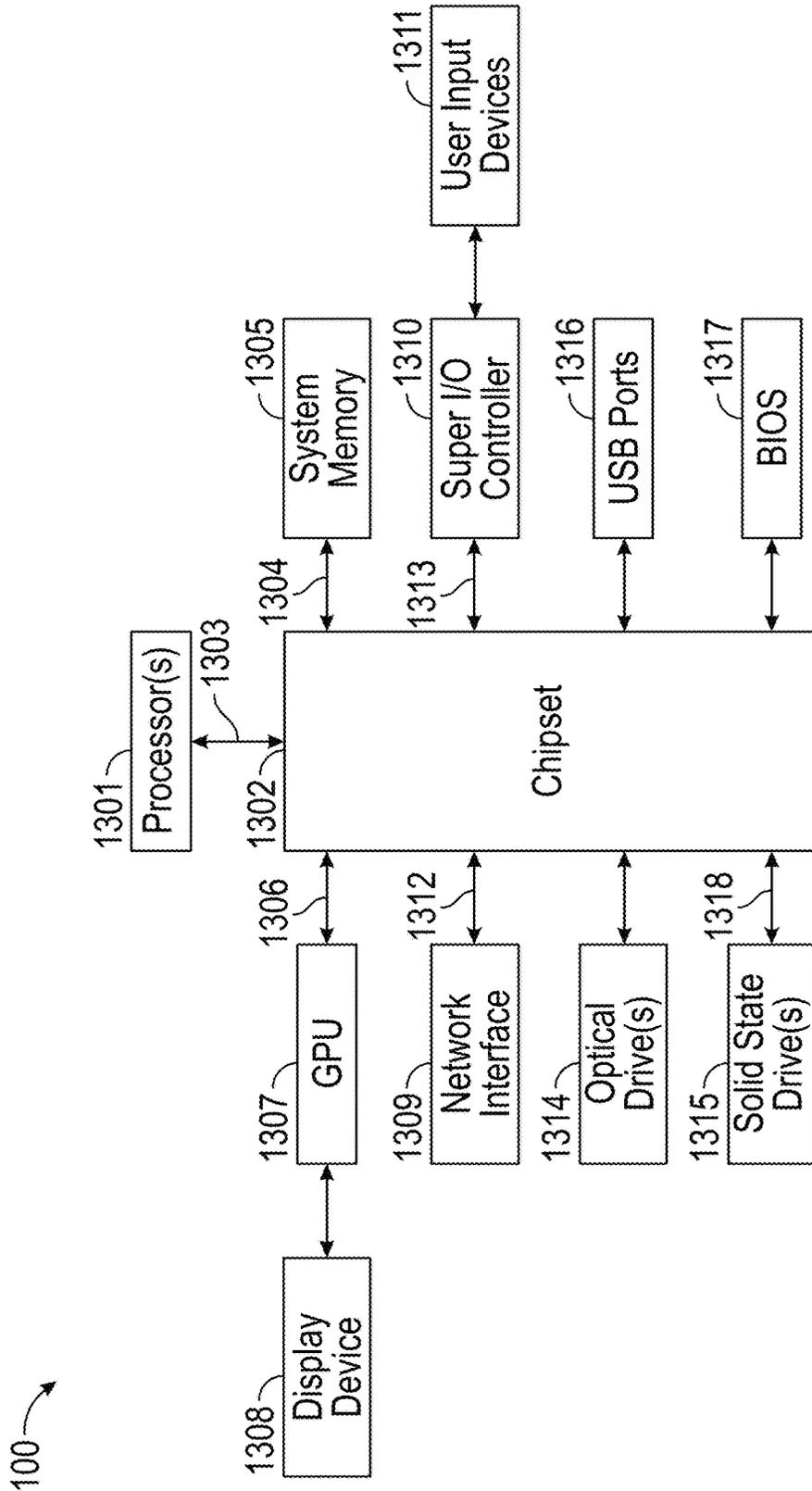


FIG. 13

**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 an 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

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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 electromagnet 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

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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 press 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 105B and kickstand 103 includes kickstand latch portion 105A (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 106A and 106B, 108A and 108B, and 108C and 108D, interact with each other (attraction and repulsion) under influence of their respective magnetic fields. In some cases, one or more of magnetic devices 106A-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 **108A** and **108B** have opposite polarity (in this example, south or “S” and north or “N”, respectively), as do magnetic devices **108C** and **108D** (S and N, respectively). In contrast, magnetic device **106A** has a first polarity orientation in the Y direction (S-N in this case), while magnetic device **106B** has an opposite polarity orientation in the Y direction (N-S).

In alternative embodiments, however, magnetic devices **106A** and **106B** 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 **108A-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 **108A** and **108C** may be fixed or stationary relative to kickstand **103**. Conversely, magnetic devices **108B** and **108D** may also be fixed or stationary relative to chassis **102**. That is, chassis **102** includes, is coupled to, and/or accommodates magnetic devices **108B** and **108D**.

Magnetic device **106A** is also fixed or stationary with respect to kickstand **103**; however, magnetic device **106B** 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 **106A** and **106B** vary over time as actuator **107** physically moves magnetic device **106B** such that the position of magnetic device **106B** 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 **106A** (clamping magnets are omitted for simplicity), and chassis **102** includes, accommodates, and/or is coupled to magnetic device **106B**.

In this embodiment, carrier **201** includes compression bracket **210** and actuator bracket **204**. Compression bracket **210** includes first guidepost **207A**, second guidepost **207B**, first detent **205A**, second detent **205B**, and surface **208**. First guidepost **207A** and second guidepost **207B** are configured to receive first return spring **202A** and second return spring **202B**, respectively. In various implementations, first return spring **202A** and second return spring **202B** may be coil springs with diameters and lengths larger than guideposts **207A** and **207B**, 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 **203A** and second orifice **203B**, first stopping pin **206A** and second stopping pin **206B**. In various implementations, first orifice **203A** may have a diameter between the diameter of first return spring **202A** and first guidepost **[202A]** **207A**. Similarly, second orifice **203B** may have a diameter between the diameter of second return spring **[202B]** **207B** and second guidepost **[202B]** **207B**. First and second stopping pins **206A-B** have a shape configured to match the shape of detents **205A-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 **207A-B** when actuator **107** is pressed (e.g., directly by a user or against a surface), against opposing forces presented by return springs **202A-B**. When actuator **107** is no longer pressed, return springs **202A-B** cause actuator bracket **204** to return to its default position, as stopping pins **206A-B** engage with detents **205A-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 **106A** and **106B** are offset from one another in the Y direction by a selected distance. As a result, a first portion of magnetic device **106A** that has a given polarity (e.g., S) sits immediately above a first portion of magnetic device **106B** having opposing polarity (e.g., N). A second portion of magnetic device **106A** sits above a groove or channel in chassis **102** that allows magnetic device **106B** to travel in the Y direction. Finally, a second portion of magnetic device **106B** 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 **106A** and **106B**. 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 **106B** sits below a plain portion of kickstand **103**, portion **702** of magnetic device **106B** sits below portion **703** of magnetic device **106A**, and portion **704** of magnetic device **106A** 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 **108A-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 **106B** to translate in the Y direction with respect to magnetic device **106A**. 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 **108A-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 its maximum travel distance, such that magnetic device **106A** is immediately above magnetic device **106B**. 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 108A-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 105A and chassis 102 may include chassis latch portion 105B.

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 105B 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 106B translates with respect to magnetic device 106A, 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 processor(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.

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18. 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. An 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.

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16. The assembly carrier of claim 15, wherein the first magnetic device and the second magnetic device have a same polarity orientation, and wherein the first magnetic 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 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, and the first magnetic device and the second magnetic 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 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, (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, and (iii) the first magnetic device and the second magnetic 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 magnetic 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 magnetic 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 magnetic 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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