



US010661595B2

(12) **United States Patent**
Kurani et al.

(10) **Patent No.:** **US 10,661,595 B2**

(45) **Date of Patent:** **May 26, 2020**

(54) **METHODS AND SYSTEMS OF
MULTIFUNCTIONAL WRITING DEVICE**

USPC 33/458, 275
See application file for complete search history.

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(*) Notice: Subject to any disclaimer, the term of this
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(21) Appl. No.: **16/680,345**

(22) Filed: **Nov. 11, 2019**

(65) **Prior Publication Data**

US 2020/0079136 A1 Mar. 12, 2020

(Continued)

Related U.S. Application Data

Primary Examiner — Yaritza Guadalupe-McCall

(63) Continuation-in-part of application No. 15/897,157,
filed on Feb. 15, 2018, now abandoned.

(60) Provisional application No. 62/470,332, filed on Mar.
12, 2017.

(51) **Int. Cl.**

B43K 29/00 (2006.01)
B43L 7/00 (2006.01)
B43K 29/08 (2006.01)
G06F 3/0354 (2013.01)
B43L 7/027 (2006.01)

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

CPC **B43K 29/004** (2013.01); **B43K 29/001**
(2013.01); **B43K 29/08** (2013.01); **B43L 7/005**
(2013.01); **B43L 7/0275** (2013.01); **G06F**
3/03545 (2013.01)

(58) **Field of Classification Search**

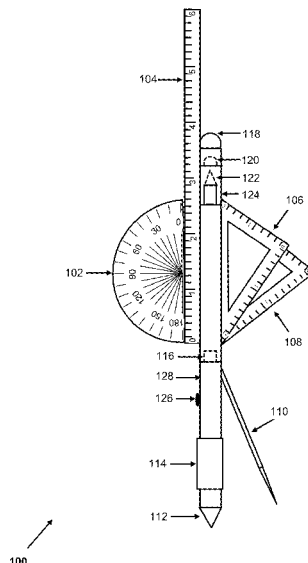
CPC **B43K 27/02**; **B43K 29/001**; **B43K 29/004**;
B43K 29/08; **B43K 29/10**; **B43K 29/20**

(57)

ABSTRACT

A multifunctional writing device comprising a hollow body, wherein the hollow body comprises one or more cavities configured to store a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, a compass needle, a USB flash drive, a stylus, and an eraser. A first writing member comprises lead and a mechanical pencil system being provided in a first portion of the hollow body. A second writing member comprising a pen system being provided in a second portion of the hollow body. A magnetic lock attaches and stores a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, and a compass needle inside a cavity. A protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, and a set square forty-five-degree (45°) triangle are removed from a cavity by pulling rectangular strip top portion.

20 Claims, 10 Drawing Sheets



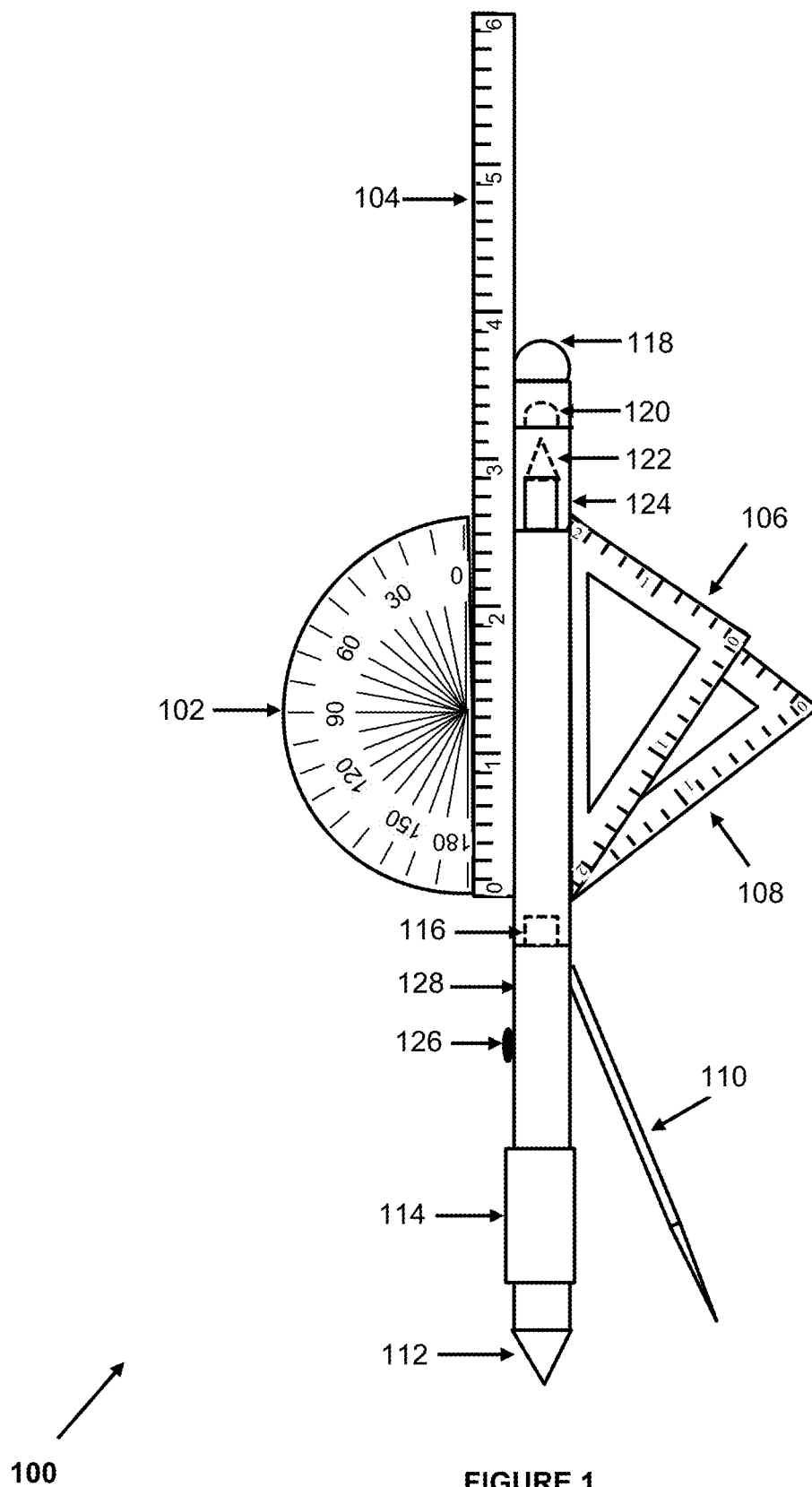
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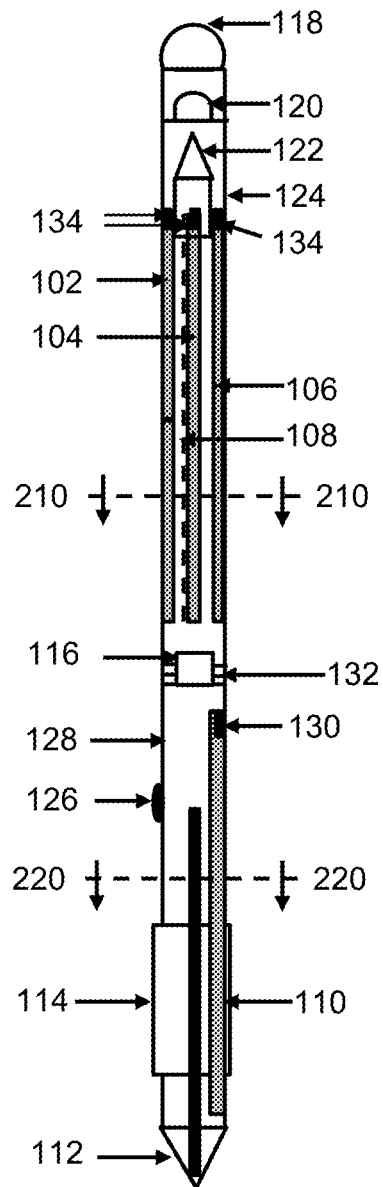
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FIGURE 2

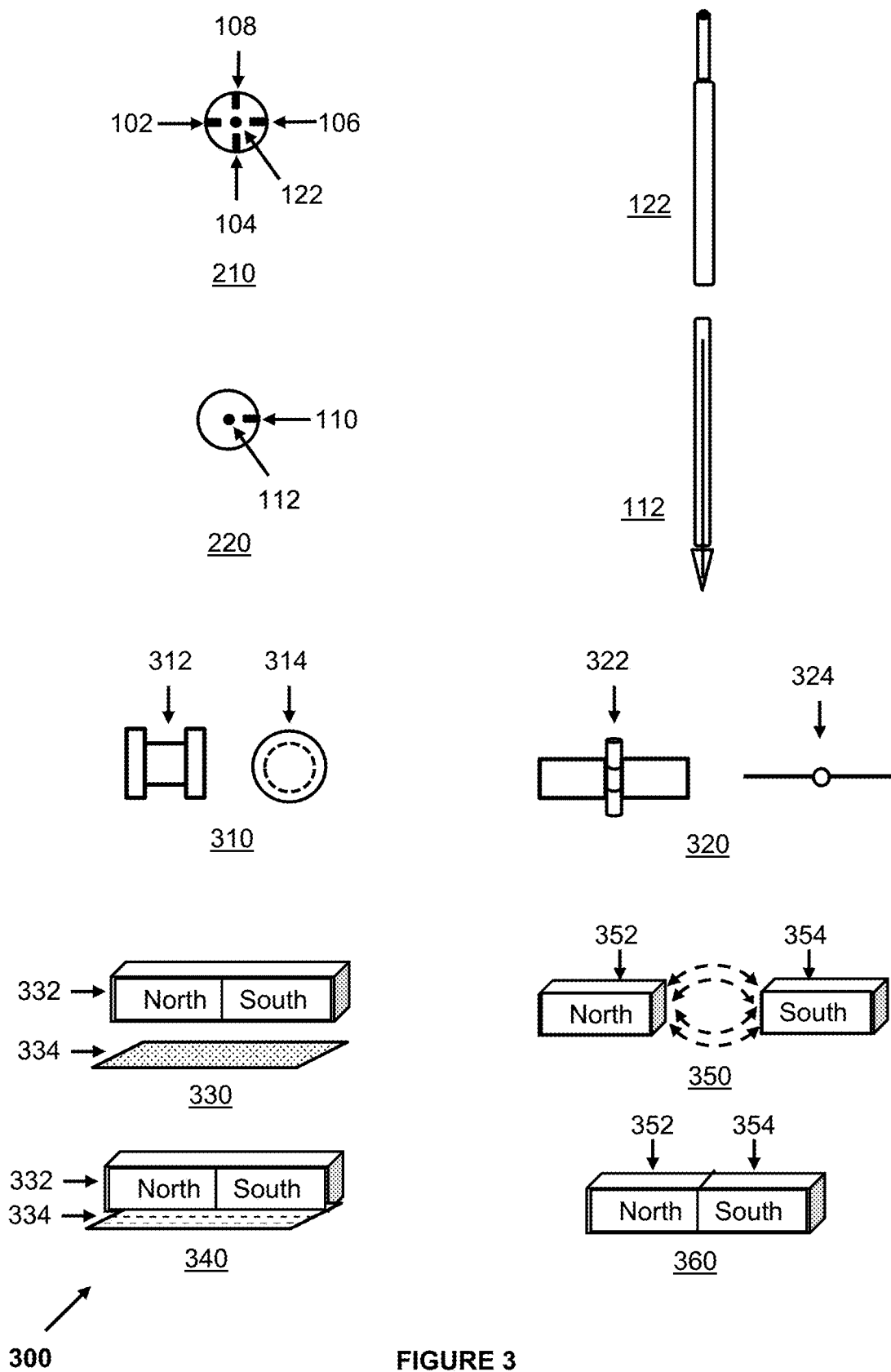


FIGURE 3

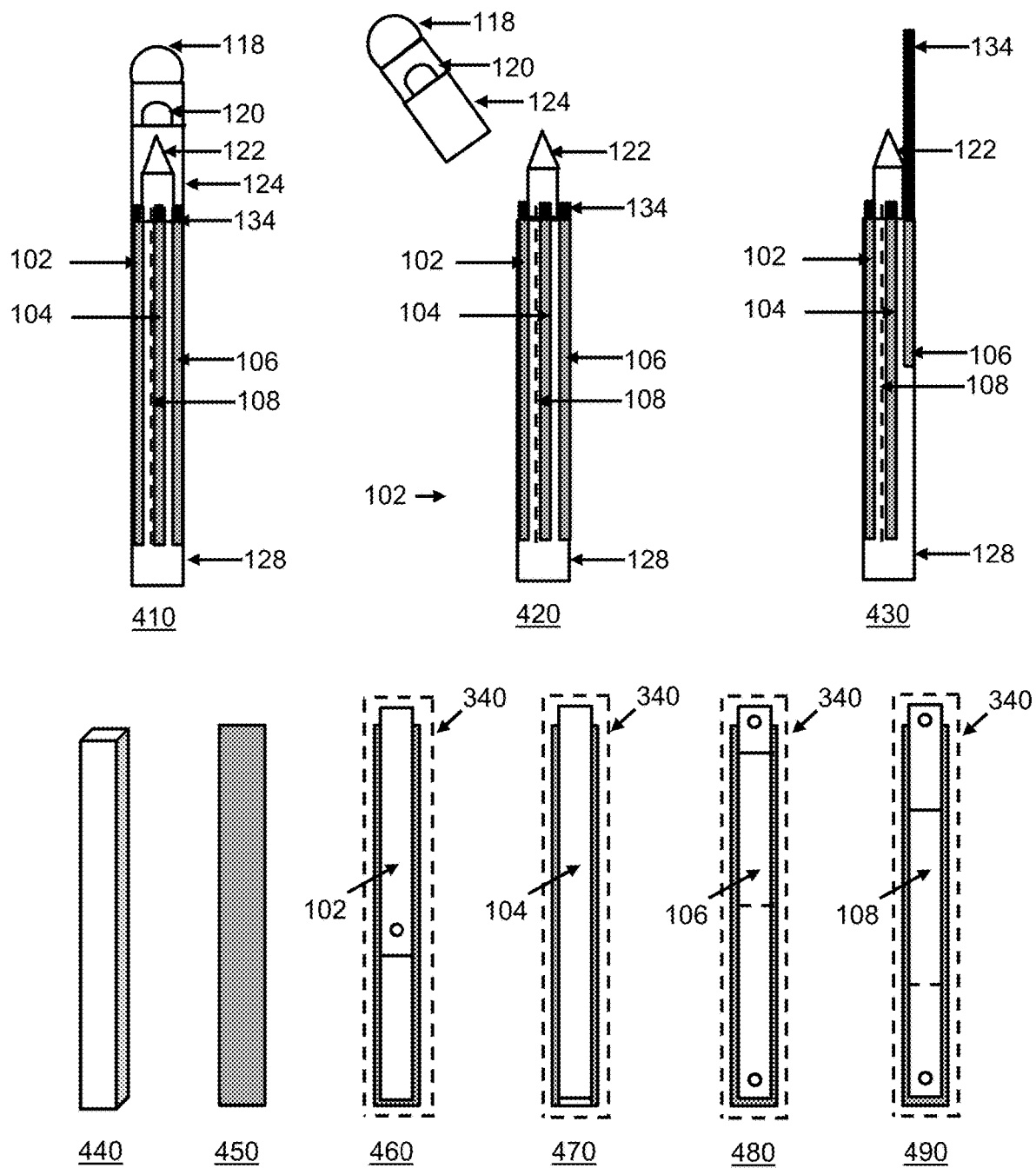


FIGURE 4

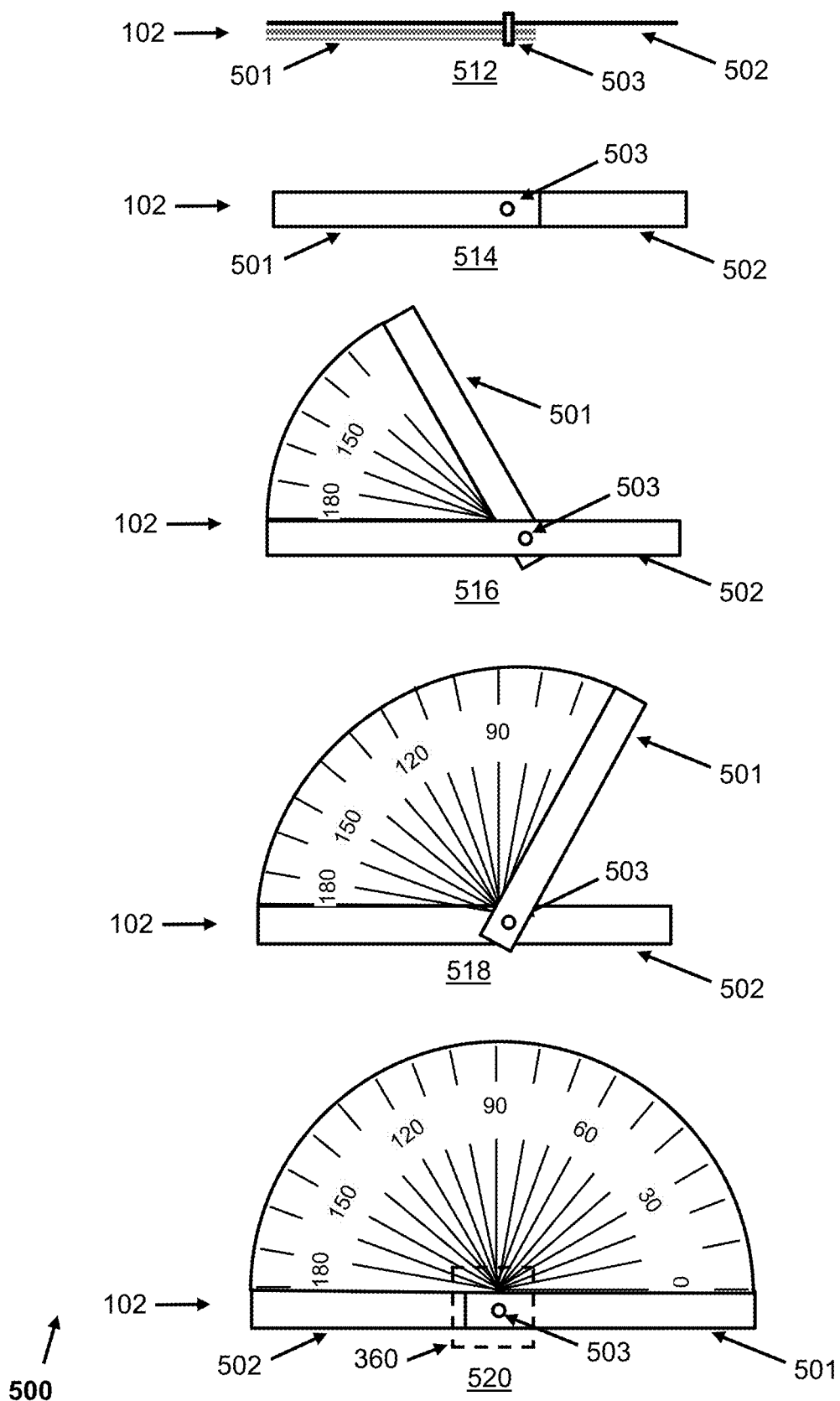


FIGURE 5

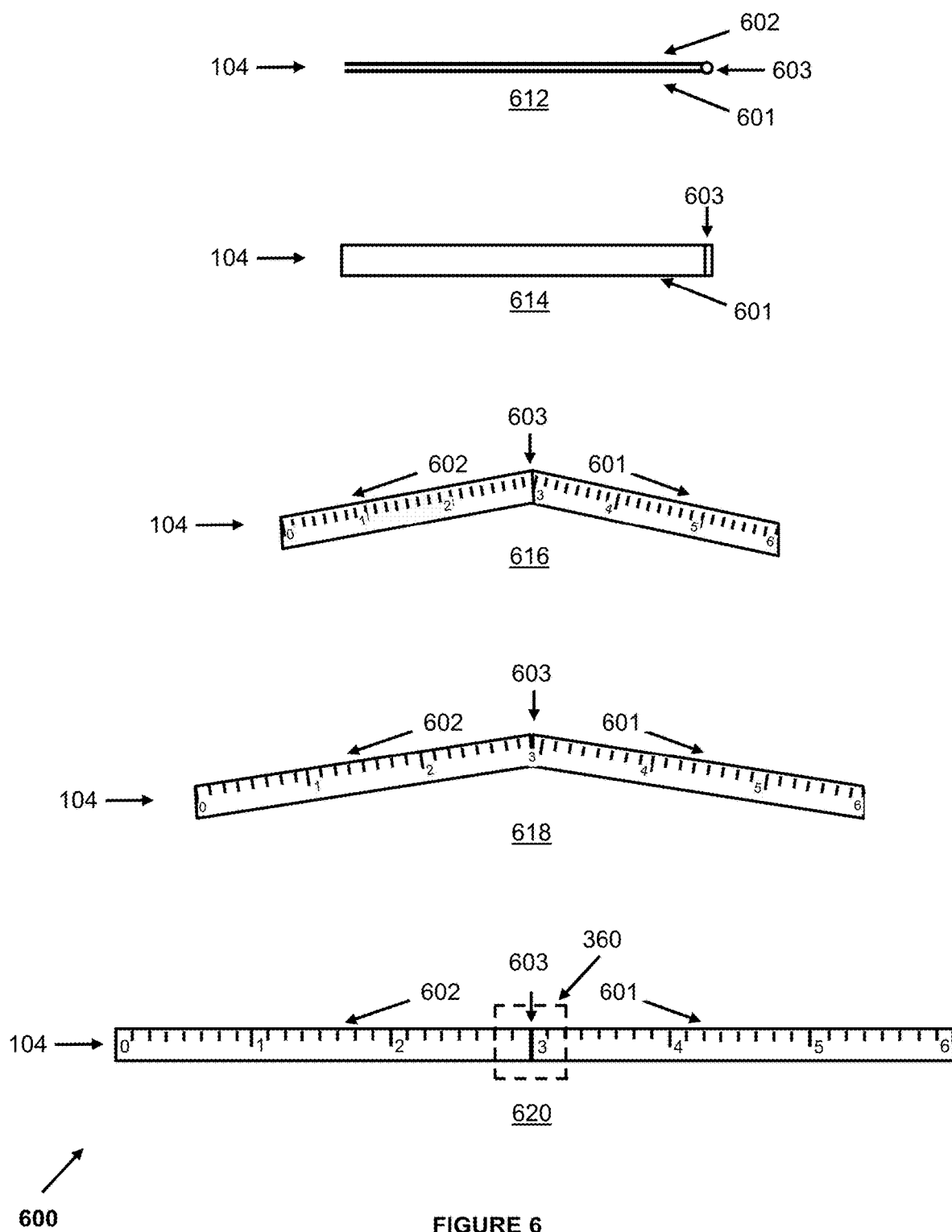


FIGURE 6

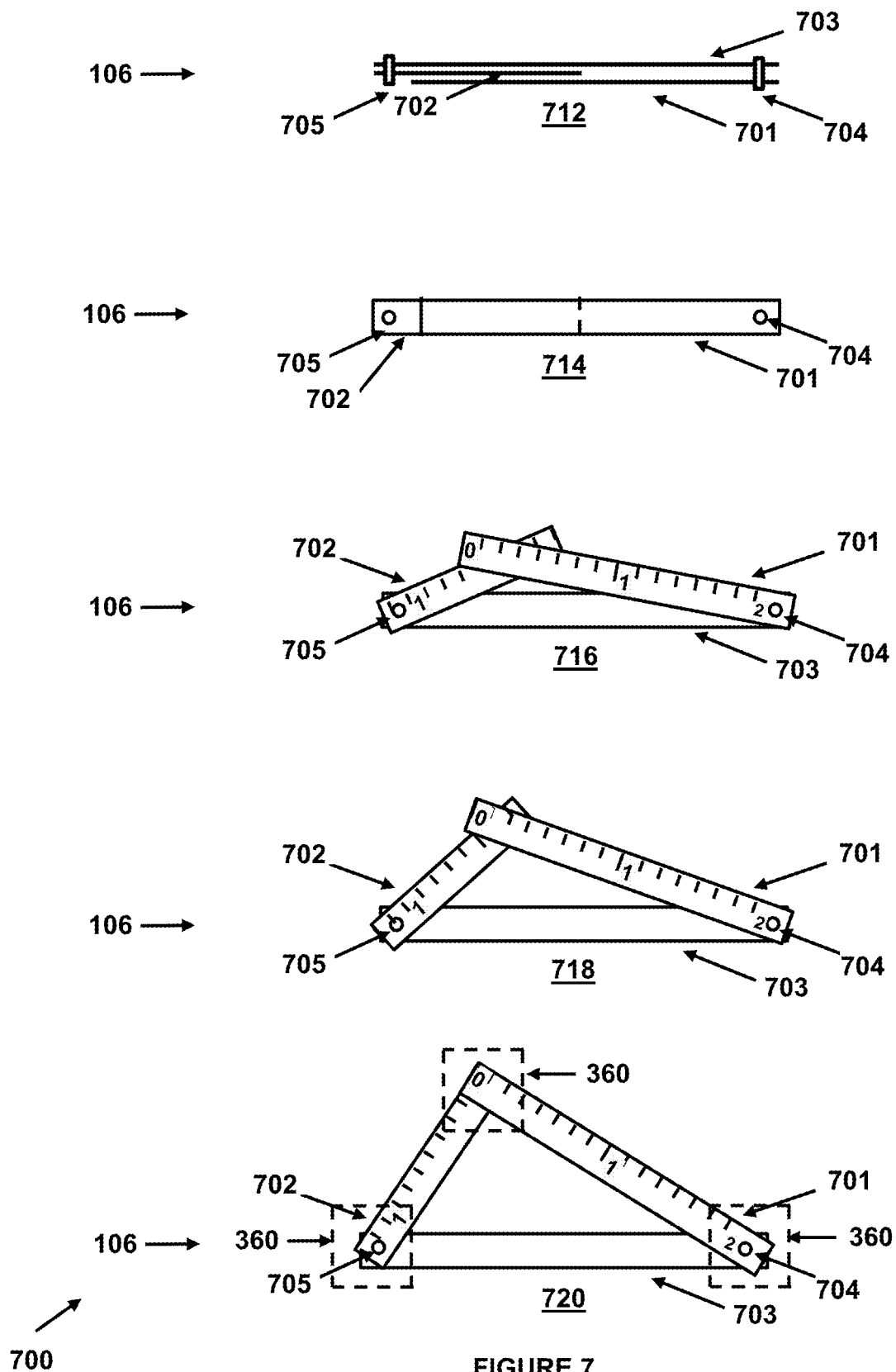
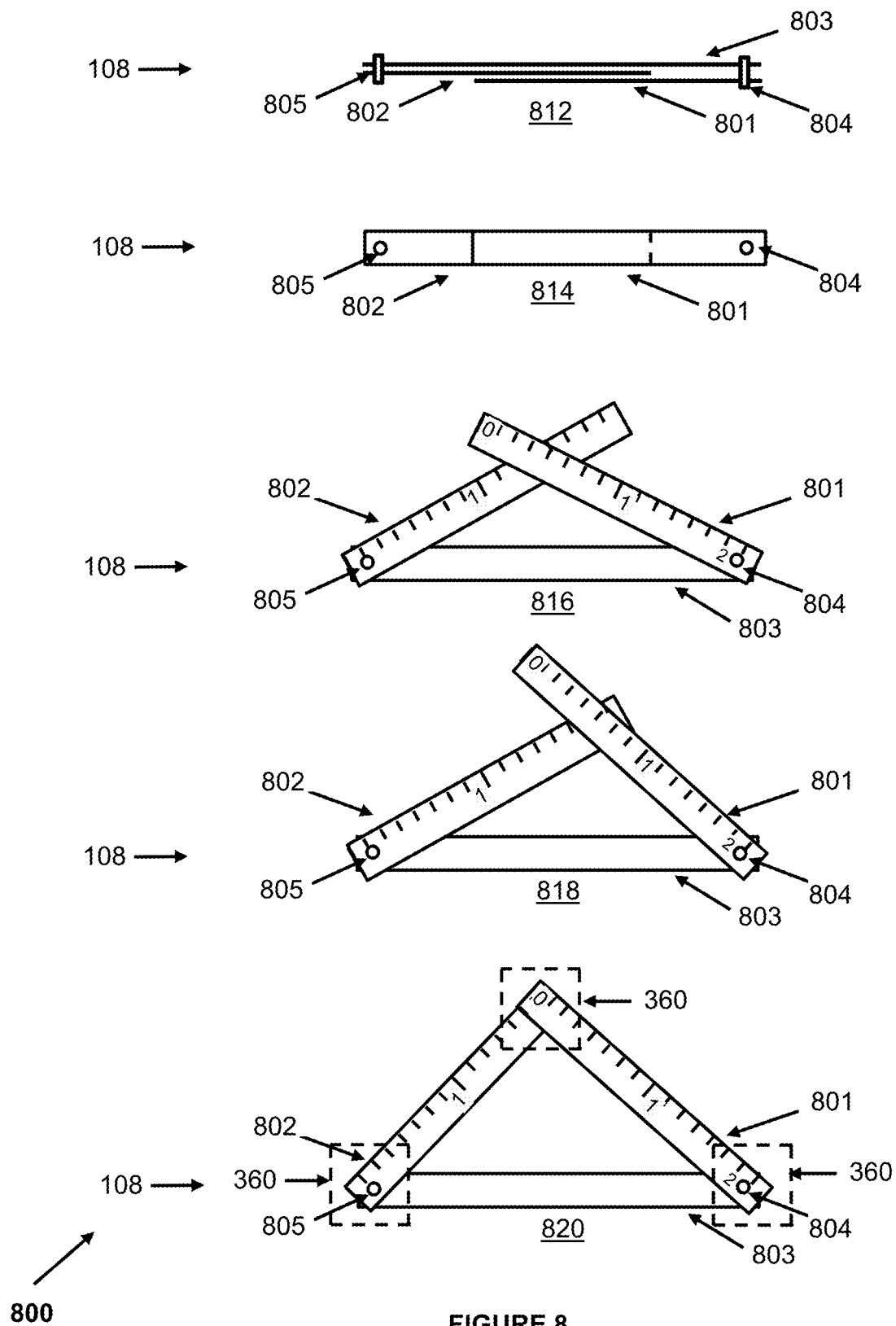


FIGURE 7



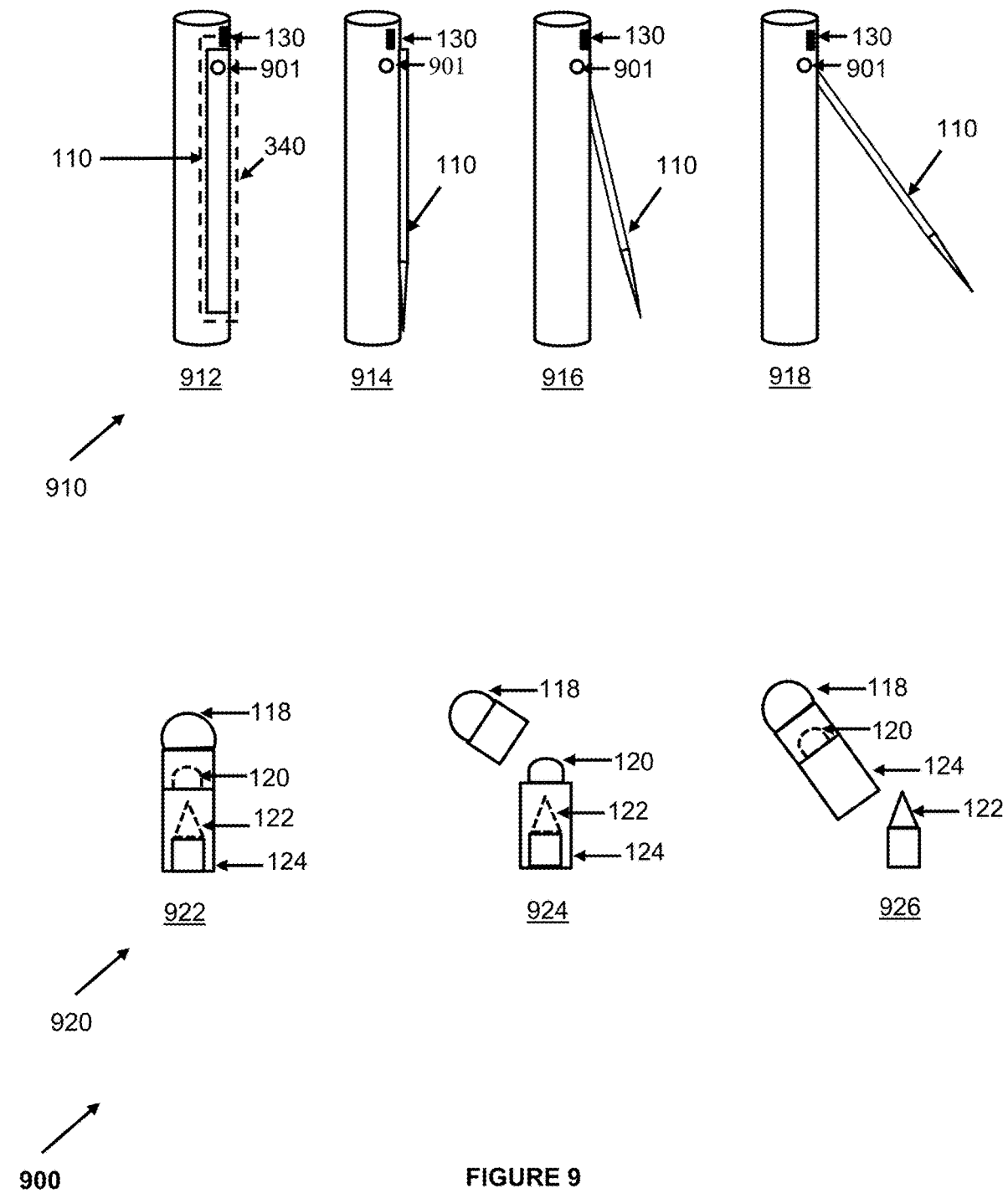
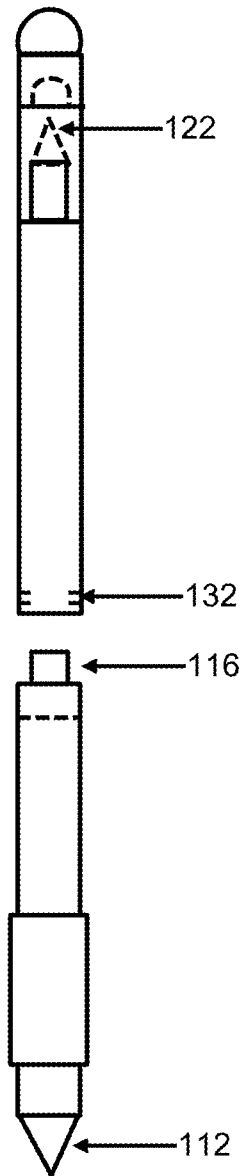


FIGURE 9



1000

FIGURE 10

METHODS AND SYSTEMS OF MULTIFUNCTIONAL WRITING DEVICE

CLAIM OF PRIORITY

This application is a continuation-in-part of U.S. patent application Ser. No. 16/385,473 filed on Apr. 16, 2019. U.S. patent application Ser. No. 16/385,473 is a continuation in part of and claims priority to U.S. patent application Ser. No. 15/897,157, filed on Feb. 15, 2018. United States Patent Application No. claims priority from U.S. provisional Application No. 62/470,332 filed on Mar. 12, 2017. These patent applications are incorporated herein by reference in their entirety.

FIELD OF THE INVENTION

This application relates generally to writing instruments, and more specifically to a system, an article of manufacture and a method of a multifunctional writing device.

DESCRIPTION OF THE PRIOR ART

Various multifunctional writing devices in the art are known for their uses as input devices on paper and paperless mediums. Ball point pens and mechanical pencils are known pen input devices available for paper mediums. They are usually in the form of the ink cartridge and pencil lead feeder inside the hollow body. The passive stylus devices are known to be used as pen input devices on paperless mediums like electronic devices, including touch screen displays with touch-sensitive transparent panels covering the screen. They are made from a material that will not scratch the surface of a touch screen display. The geometry tools like compasses, rulers, protractors, and set squares are usually individual pieces made from various materials.

U.S. Pat. No. 1,544,471 to Miller discloses a combination tool with elements necessary to the use of a carpenter in laying off work of various kinds and to make the construction simple. The tools housed are ruler, caliper, blade, and a pencil. Miller shows that ruler, caliper and blade are held into position by clamping screw. The caliper and blade are stored inside the housing. The pencil is retained inside the pencil holder. Miller discloses a combination tool comprising a stock provided with a longitudinal slot in one edge portion, a blade pivotally connected with the stock at one end thereof and capable of any position between that of perpendicularity to the stock and folded position within the slot, slide mounted on the blade. A pencil holder is carried by the stock on the edge opposite the slot, means being provided for holding the pencil. Miller discloses caliper which can be used as compass needle. Miller discloses one barrel housing for caliper and blade tools and separate housing for pencil. The ruler is attached to the caliper and blade housing.

Unfortunately, such combination tools to the use of a carpenter which include lead pencil, compass-needle, and a ruler has dedicated different tubular housings for each tool, with big clamping screws that take time and effort to open and close tools, do not work on paperless mediums, are bulky and only have limited utility in school and work environments, and electronic devices with touch screen displays. Thus, there is a need for multifunctional writing devices in a single tubular housing with quick removal from a storage cavity and effortless quick opening and closing of a tool. The locking mechanism should have no moving parts to bind or wear out. The multifunctional writing device

should be light weight and user should be able to use on paper and paperless mediums.

Today, almost all people have a pen or pencil with them, because they are so light and easy to carry around. People have also found all sorts of ways to make them look diverse and have added so many new functions to them in our contemporary society. People have also used styluses, pencils, geometry tools like compasses, protractors, rulers, set squares and other fancy stationary supplies, but they have to carry and use multiple devices.

In stores these days, most of the products in this device are sold at exorbitant prices, individually or in some combination based on prior art solutions. A further problem is compounded where drawing tools do not exist, for example; a compass, a protractor, a ruler, and set squares in a single device. The problem exists where person has to purchase, carry and use multiple devices. However, this affordable innovative device combines all of them in a single housing. School kids will not have to lug a whole box of pens, pencils and drawing sets to school; instead, they will be able to transport all of the most critical writing and drawing tools in only one device.

Teachers, architects, engineers, builders, construction worker, doctors, scientists, astronomers, cosmonauts, police, firefighters, etc. will not have to carry multiple devices; instead they will only need this device comprising all the input writing and drawing sets at the reasonable price. The benefits are many, for e.g. the device consisting of all commonly used tools will help students who cannot afford individual, costly school supplies, reduce the cost of school classroom supplies, and a person only has to carry a single device instead of multiple items. This allows for less worry about breaking or losing individual items and reduces waste since the device is reusable and environmentally friendly. Thus, there remains a considerable need for a device that can conveniently store, in a single housing, a ball point pen, mechanical pencil, eraser, stylus for touch screen, protractor, ruler, set square thirty/sixty-degree (30/60°), set square of forty-five-degree (45°) triangle, a compass, USB flash drive, and a grip.

SUMMARY OF THE INVENTION

In one aspect, a multifunctional writing device includes a hollow body, wherein the hollow body comprises one or more cavities configured to store a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, a compass needle, a USB flash drive, a stylus, and an eraser. A first writing member comprises lead and a mechanical pencil system being provided in a first portion of the hollow body. A second writing member comprising a pen system being provided in a second portion of the hollow body. A magnetic lock attaches and stores a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, and a compass needle inside a cavity. A protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, and a set square forty-five-degree (45°) triangle are removed from a cavity by pulling rectangular strip top portion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a top plan view of a multifunctional writing device with geometry tools in the extended position, according to some embodiments.

FIG. 2 illustrates side elevation view of a multifunctional writing device with parts in the collapsed position and the front face removed, according to some embodiments.

FIG. 3 illustrates items like cross sectional views, pen, pencil, pivot pin, hinge and magnetic lock systems of a multifunctional writing device, according to some embodiments.

FIG. 4 illustrates an example side elevation view of a multifunctional writing device with parts in the collapsed position and the front face removed showing various technical drawing tools stored inside cavities, according to some embodiments.

FIG. 5 illustrates an example top view and front view of a multifunctional writing device showing steps to open and close a protractor, according to some embodiments.

FIG. 6 illustrates an example top view and front view of a multifunctional writing device showing steps to open and close a ruler, according to some embodiments.

FIG. 7 illustrates an example top view and front view of a multifunctional writing device showing steps to open and close a set square thirty/sixty-degree (30/60°) triangle, according to some embodiments.

FIG. 8 illustrates an example top view and front view of a multifunctional writing device showing steps to open and close a set square forty-five-degree (45°) triangle, according to some embodiments.

FIG. 9 illustrates an example front view of a multifunctional writing device showing steps to open and close a compass needle and access stylus and pen, according to some embodiments.

FIG. 10 illustrates another example front view of a multifunctional writing device showing a USB port, according to some embodiments.

The Figures described above are a representative set and are not an exhaustive with respect to embodying the invention.

DESCRIPTION

Disclosed is a system, method, and article of manufacture for methods and systems of multifunctional writing device. The following description is presented to enable a person of ordinary skill in the art to make and use the various embodiments. Descriptions of specific devices, techniques, and applications are provided only as examples. Various modifications to the examples described herein can be readily apparent to those of ordinary skill in the art, and the general principles defined herein may be applied to other examples and applications without departing from the spirit and scope of the various embodiments.

Reference throughout this specification to “one embodiment,” “an embodiment,” “one example,” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases “in one embodiment,” “in an embodiment,” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

Furthermore, the described features, structures, or characteristics of the invention may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided, such as examples of open and closed position of various drawing tools, buttons to lock and unlock the tools, etc., in order to provide a thorough understanding of embodiments of the invention. One who is skilled in the relevant art can recog-

nize, however, that the invention may be practiced without one or more of the specific details, or with other methods, components, materials, and so forth. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

Exemplary Definitions

Compass can be a drawing tool used to inscribe circles, arcs, etc. A compass can be a piece of equipment used for drawing circles, consisting of two thin parts joined in the shape of the letter V. A compass can be piece of equipment used for measuring or drawing lines and angles, consisting of two pieces of metal or other materials with pointed ends that are joined together at the top. As dividers, a compass can also be used as a tool to measure distances (e.g. on maps and the like). A compass can be for mathematics, drafting, navigation, and other purposes.

Eraser can be a soft rubber or plastic, used to remove something written.

Grip can be a soft rubber or plastic, used to more easily hold and use the multifunctional writing device when writing or drawing.

Hinge can be a movable joint or mechanism on which rectangular strips swing as they open or close. A hinge can connect two solid objects.

Magnet can be piece of iron that has its component atoms so ordered that the material exhibits properties of magnetism, such as, attracting other iron containing ferromagnetic materials such as iron, cobalt, nickel and gadolinium.

Magnetism can be a physical phenomenon produced by the motion of an electric charge, resulting in attractive and repulsive forces.

Magnetic lock can be a locking system that consists of a permanent magnet object which attaches itself to a ferromagnetic material made object. Ferromagnetic materials are attracted to permanent magnet because they are full of tinier magnets which align with the field of the larger permanent magnet. A magnetic lock can also consist of two permanent magnet objects with opposite polarities attached to each other. Both of this magnetic lock system allows the two objects to be attached together and cannot be opened unless some force is applied.

Mobile device can include a handheld computing device that includes an operating system (OS) and touch screen that may run various types of application software, also known as apps.

Pen can be a writing implement used to apply ink to a surface, such as paper, for writing or drawing.

Pencil can be a writing implement or art medium constructed of a narrow, solid pigment core inside a protective casing which prevents the core from being broken or leaving marks on the user's hand during use.

Pivot can be can be pin or shaft on which a mechanism turns or folds.

Protractor can be an instrument for measuring angles. A protractor can measure angles in degrees (°). A radian-scale protractor measures angles in radians. A protractor can be divided into one-hundred and eighty (180) equal parts.

Set square can be an object used in engineering and technical drawing, with the aim of providing a straightedge at a right angle or other particular planar angle to a baseline. As an example, a set square can be a forty-five-degree (45°) triangle or a set square thirty/sixty-degree (30/60°) triangle object.

Ruler can be a straight, rectangular device typically marked at regular intervals, used to draw straight lines or measure distances in customary or metric units.

Stylus can be a writing utensil and/or a small tool for some other form of marking or shaping. A small, pen-shaped instrument that is used to input commands to a computer screen, mobile device or graphics tablet. With touchscreen devices, a user can place a stylus on the surface of the screen to draw or make selections by tapping the stylus on the screen. A stylus tip can also be a nib.

Technical drawing tool can be a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, a compass needle. Technical drawing tool can be used for measurements and layouts of drawings.

Universal Serial Bus (USB) is an industry standard that defines cables, connectors and communications protocols for connection, communication, and power supply between computers and devices.

Exemplary Systems and Methods

FIGS. 1-10 illustrate various perspectives and views of an example multifunctional writing device **100**, according to some embodiments. Multifunctional writing device **100** can include various other integrated devices, including, inter alia: a pen, a pencil, a stylus for touch screen input device for writing, and a geometry tool kit consisting of a protractor **102**, ruler **104**, a square thirty/sixty-degree (30/60°) triangle **106**, set square forty-five-degree (45°) triangle **108**, and a compass needle **110**, contained in a single housing and/or any various permutations thereof. It is noted that in some example embodiments, the multifunctional writing device **100** can include various technical drawing tools including but not limited to: pens, compasses, protractors, rulers, and set squares. Drafting tools can be used for the measurement and layouts of drawings, or to improve the consistency and speed when creating standard drawings. The multifunctional writing device **100** can include storage cavities for a ball point pen, pencil lead, a stylus, an eraser, etc. In one example, multifunctional writing device **100** with a hollow body **128** can include a protractor **102**, a ruler **104**, a set square thirty/sixty-degree (30/60°) triangle **106**, a set square forty-five-degree (45°) triangle **108**, a compass needle **110**, a pencil **112**, a grip **114**, USB flash drive **116**, an eraser **118**, a stylus **120** and a pen **122**.

In one example embodiment, the multifunctional writing device **100** can enable the user to utilize a single writing system for various purposes. The multifunctional writing device **100** can include a mechanical pencil **112** and ball point pen **122** projecting out from either side to switch from a pen to a pencil with only a flip of the device. The multifunctional writing device **100** can have a stylus **120**. The stylus can enable writing and drawing on a touch screen surface. The multifunctional writing device **100** can include an eraser **118** sticking out from the cap of the pen and a customizable grip on the pencil to make the appearance of the device fashionable yet comfortable.

The multifunctional writing device **100** can include mechanisms for storing various drawing tools with said multifunctional writing device. Magnetic lock **340** mechanism can attach or retain a protractor **102**, a ruler **104**, a set square thirty/sixty-degree (30/60°) triangle **106**, a set square forty-five-degree (45°) triangle **108**, a compass needle **110** inside a cavity. This can ensure that they do not move inside the cavity during use of pencil **112** and pen **122**.

A magnetic lock **360** can also attach the edges of a rectangular strip together when they are completely open to

form a protractor, a ruler set square thirty/sixty-degree (30/60°) triangle **106**, and a set square forty-five-degree (45°) triangle **108**.

The multifunctional writing device **100** can benefit various user types, such as, inter alia: students, teachers, architects, engineers, builders, construction worker, doctors, scientists, astronomers, cosmonauts, police, firefighters, etc. The user can be more organized with one device that serves multiple purposes instead of carrying multiple devices for one use. Some advantages of the multifunctional writing device **100** in various applicable situations such as, inter alia: writing, drawing, etc. For example, the multifunctional writing device **100** can be used when a student performs assignments (e.g. homework, exercises, mathematical drawings, tests, etc.). The multifunctional writing device **100** can be lightweight and composed of various materials such as, inter alia: plastic, wood, carbon fiber, glass, cardboard, foam and/or metal.

Multifunctional writing device **100** includes a conventional pen input device, such as a ball point pen and/or a mechanical pencil lead feeder for use on a paper or other writing medium, and a stylus, for use with a paperless medium, carried in a single housing which includes a cap portion and a barrel portion. In one embodiment, multifunctional writing device **100** also includes a protractor **102**, a ruler **104**, a set square thirty/sixty-degree (30/60°) triangle **106**, a set square forty-five-degree (45°) triangle **108**, a compass needle **110**, a pencil **112**, a grip **114**, USB flash drive **116**, an eraser **118**, a stylus **120** and a pen **122** in a single hollow body **128**. In some embodiments, a cap arrangement can be provided that selectively and alternatively allows the ball point pen and/or mechanical pencil lead feeder in a use position, for example, by way of a relatively simple twist of the cap portion with respect to the barrel portion. Embodiments also include drawing tools with a housing, compartment regions, pins, hinges, and an interchangeable implement mounted on one of the pins by means of a coupling mechanism which can be moved by means of a pivot bearing between inwardly pivoted position and outwardly functional position.

The drawing tools allow for various activities and can perform the following example functions: writing; erasing written work; drawing straight lines; making perfect circles; making arcs; drawing accurate angles; measuring angles; etc.

FIG. 1 illustrates a top plan view of a multifunctional writing device **100** with geometry tools in the extended position, according to some embodiments.

A multifunctional writing device **100** comprises a hollow body **128** with one or more cavities configured to store a protractor **102**, a ruler **104**, a set square thirty/sixty-degree (30/60°) triangle **106**, a set square forty-five-degree (45°) triangle **108**, a compass needle **110**, a USB flash drive **116**, a stylus **120**, and an eraser **118**.

The first writing member comprises lead and a mechanical pencil **112** system provided in a first portion of the hollow body **128**, and the first writing tip is axial with respect to the hollow body **128**.

The second writing member comprises pen **122** system provided in a second portion of the hollow body **128**, and the second writing tip is axial with respect to the hollow body **128**. As shown in FIG. 1 the first portion of the hollow body **128** is at an opposite end of the second portion of the hollow body **128**.

Multifunctional writing device **100** can include a protractor **102**. Protractor **102** can be stored in a cavity of the hollow body **128**. Protractor can be used in a detached form.

Protractor **102** can be used to measure angles (e.g. in degrees)^(°), radians, etc.). Radian-scale protractors measure angles in radians. For example, protractor **102** can have two (2) sets of numbers. For example, a bottom set can be for angles that open to the left and the upper set of the protractor is used to measure angles that open to the right.

Ruler **104** can be stored in a cavity of the hollow body **128** of multifunctional writing device **100**. Ruler **104** can be marked with alpha-numeric text, symbols, lines, etc. on one or both surfaces. Ruler **104** can function as a line gauge. Ruler **104** can be a straightedge with equally spaced markings along its length. The equally spaced lines can mark metric spacing's, in the British imperial and United States customary systems of measurement, etc. The ruler cavity can run adjacent to the protractor cavity.

Thirty/sixty-degree (30/60°) triangle **106** and forty-five-degree (45°) triangle **108** can be set square instruments. Thirty/sixty-degree (30/60°) triangle **106** or forty-five-degree (45°) triangle **108** can be stored in a cavity of the hollow body **128**. The thirty/sixty-degree (30/60°) triangle **106** and forty-five-degree (45°) triangle **108** can be used to draw a straightedge at a specified angle. Thirty/sixty-degree (30/60°) triangle **106** and forty-five-degree (45°) triangle **108** are provided by way of example and not of limitation as in other example embodiments; other angles for set square tools can be utilized. Thirty/sixty-degree (30/60°) triangle cavity can run adjacent to the ruler cavity. Forty-five-degree (45°) triangle cavity can run adjacent to thirty/sixty-degree (30/60°) triangle cavity.

Compass needle **110** can be affixed to second portion of the hollow body **128**. An affixed compass needle **110** can be retractable and/or otherwise storable in a cavity of hollow body **128**.

Writing instrument pencil **112** can be a mechanical-pencil in the first portion of the hollow body **128**. Accordingly, the interior portion of multifunctional writing device **100** can include the various mechanisms/devices for mechanical lead pencils. Pencil lead can be advanced using the pencil push button **126**.

Writing instrument pen **122** can be a made of ball point cartridge in the second portion of the hollow body **128**. Accordingly, the interior portion of multifunctional writing device **100** can include the various mechanisms/devices for ball point pen **122**.

Grip **114** can be the portion that part of, or attachment to, hollow body **128** that allows multifunctional writing device **100** to be moved or used by a user's hand. Grip **114** can be formed with a rubber coating and/or other material (e.g. thermoplastic, etc.). The material of grip **114** can provide friction against the hand/fingers of user in order to reduce the gripping force needed to achieve a reliable grip on multifunctional writing device **100**. USB flash drive **116** can be used as a data storage, data back-up and transfer of computer files.

The tip of the second portion of the hollow body **128** comprises an eraser cap **124** over a tip of the pen system. The eraser cap **124** comprises an eraser **118**, and a stylus **120**. The user can remove the top of the eraser cap **124** with simple twist and access the stylus **120**. An eraser **118** can be a removable end portion of multifunctional writing device **100**. Stylus **120** can be attached with friction, screw thread, etc. The pen **122** can be accessed by removing the eraser cap **124**.

Hollow body **128** can be the long barrel-housing part of the main body of multifunctional writing device **100**. In example embodiments, protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, forty-five-degree (45°)

triangle **108**, and a compass needle can be stored in a cavity of hollow body **128**. A protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, forty-five-degree (45°) triangle **108**, and a compass needle **110** can be made from plastic, wood, carbon fiber, glass, cardboard, foam and/or metal. Hollow body **128** can be formed from metallic, wood and/or plastic material(s).

The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, and forty-five-degree (45°) triangle **108** can be completely removed from the respective cavity of the housing of the multifunction writing device. They can be used as individual, technical drawing instruments.

FIG. 2 illustrates side elevation view **200** of a multifunctional writing device with parts in the collapsed position and the front face removed of a multifunctional writing device **100**, according to some embodiments. This view illustrates various internal parts of multifunctional writing device **100**.

FIG. 2 also depicts the section on the line **210-210** and on the line **220-220**. These are described further in FIG. 3.

Example embodiments are designed to make various technical drawing tools available in a single barrel housing. The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, and a forty-five-degree (45°) triangle **108** can be housed in four cavities of the second portion of the hollow body **128**. The compass needle **110** is housed in the cavity of the first portion of the hollow body **128**.

The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, and a forty-five-degree (45°) triangle **108** can have identical cavity sizes.

The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, and a forty-five-degree (45°) triangle **108** can be removed from a cavity by simply pulling out the rectangular strip top portion **134**.

The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, and a forty-five-degree (45°) triangle **108** can be stored inside any of the four cavities by a simple push in the second portion of the hollow body.

The compass needle **110** can be released from the cavity in the first portion of the hollow body **128** by simply clicking the push button **130**.

The compass needle **110** can be placed inside the cavity in the first portion of the hollow body **128** by a simple push towards the cavity opening.

Writing instrument pencil **112** can be a mechanical pencil in the first portion of the hollow body **128**. Accordingly, the interior portion of multifunctional writing device **100** can include the various mechanisms/devices for pencils. Accordingly, the interior element of the pencil can be in hollow body **128**.

Writing instrument pen **122** can be a ball point pen in the second portion of the hollow body **128**. Accordingly, the interior portion of multifunctional writing device **100** can include the various mechanisms/devices for pen. Accordingly, the interior element of the pen can be in hollow body **128**.

The pen and pencil can be separated into two pieces near the bottom of the USB flash stick **116** by a simple twist around the screw thread **132**.

FIG. 3 illustrates items **300** like cross sectional views **210** and **220**, pen **122**, pencil **112**, pivot pin **310**, hinge **320** and magnetic locks **340** and **360** of a multifunctional writing device **100**, according to some embodiments.

Element **210** is a section on the line **210-210** of FIG. 2. An example section view of the protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, forty-five-degree (45°) triangle **108** housed in the cavities of the second

portion of the hollow body **128** is shown. The tools are in a closed position inside the cavities. The pen **122** can be seen in the cross-sectional view.

Element **220** is a section on the line **220-220** of FIG. 2. An example placement of a compass needle **110** housed in the cavity of the first portion of the hollow body **128** is shown. The compass needle **110** is in a retracted position inside the cavity. The mechanical pencil **112** can be seen in the cross-sectional view.

Pivot pin **310** mechanism consisting of short metal pins or bolts is used to hold two rectangular strips of a technical drawing tool together. FIG. **310** illustrates pivot pin front view **312** and side view **314**.

The rectangular strips of a protractor **102**, a ruler **104**, a thirty/sixty-degree (30/60°) triangle **106**, and a forty-five-degree (45°) triangle **108** are attached together by the pivot pin **310**. It also allows for easy movement of the rectangular strips around the pin.

Hinge **320** can be a movable joint or mechanism on which rectangular strips swings as it opens or closes. It connects two rectangular strips. Hinge **320** illustrates hinge front view **322** and top view **324**. Ruler **104** is made of two rectangular strips consisting of hinge **320** in the middle.

A magnetic lock **340** can be a locking mechanism that consists of permanent magnet object **332** and ferromagnetic material object **334**. Element **330** illustrates that ferromagnetic material object **334** are attracted to permanent magnet because they are full of tinier magnets which align with the field of the larger permanent magnet **332**. The permanent magnet object **332** attaches to a ferromagnetic material object **334** when they are very close.

The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, a forty-five-degree (45°) triangle **108**, and a compass needle **110** are made of permanent magnet and are attached to ferromagnetic material based cavities using magnetic lock **340**.

A magnetic lock **360** can be a locking mechanism that consists of two permanent magnetized edges **352** and **354** with opposite polarity. As show in element **350**, the permanent magnet has a distinct north and south magnetic pole. North pole **352** of one magnet is attracted towards the South pole **354** of another magnet. This magnetic principle is used to create magnetic lock between 2 rectangular strips or plates with opposite polarity near the pivot pin or hinge of the technical drawing tools when they are in open position.

A magnetic lock **360** mechanism attaches a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, and a set square forty-five-degree (45°) triangle rectangular strips together in the open position. In a completely open position, the two rectangular strips contain opposite polarities around the pivot pin, ensuring the tools remains locked during usage.

FIG. **4** illustrates an example side elevation view **400** of a multifunctional writing device **100** with parts in the collapsed position and the front face removed showing various technical drawing tools inside cavities, according to some embodiments. Side elevation view **400** illustrates various steps to access the technical drawing tools from the cavities.

The technical drawing tools are stored or retained inside the cavities as depicted in element **410**. The technical drawing tools can be accessed after eraser cap **124** is removed as shown in element **420**. The protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, and a forty-five-degree (45°) triangle **108** can now be removed from the

cavity second portion of the hollow body **128** by pulling the rectangular strip top portion **134** as illustrated in element **430**.

The magnetic lock **340** attaches and stores a protractor **102**, a ruler **104**, a set square thirty/sixty-degree (30/60°) triangle **106**, a set square forty-five-degree (45°) triangle **108**, and a compass needle **110** inside a cavity when the technical drawing tools are not in use.

Element **440** is an isometric view of a cavity inside which any of the protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, or a forty-five-degree (45°) triangle **108** can be stored or retained. Element **450** illustrates empty cross sectional view of a cavity.

Technical drawing tool cavities are made of ferromagnetic material such as iron, cobalt, nickel and gadolinium. This allows the protractor **102**, ruler **104**, thirty/sixty-degree (30/60°) triangle **106**, forty-five-degree (45°) triangle **108**, and a compass needle **110** with permanent magnet properties to be stored and magnetically locked or retained in a place inside a cavity of hollow body **128**. The magnetic lock **340** ensures that the stored technical drawing tools do not move inside the cavity during the use of multifunctional writing device **100** pencil **112**, pen **122**, USB **116**, eraser **118** and stylus **122**.

Element **460** shows a protractor **102** in a closed position magnetically attached and stored in a protractor cavity in the second portion of the hollow body **128**. The magnetic lock **340** attaches the protractor **102** inside the cavity.

Element **470** shows a ruler **104** in a closed position magnetically attached and stored in a ruler cavity and runs adjacent to the protractor cavity in the second portion of the hollow body **128**. The magnetic lock **340** attaches the ruler **104** inside the cavity.

Element **480** shows a set square thirty/sixty-degree (30/60°) triangle **106** in a closed position magnetically attached and stored in a set square thirty/sixty-degree (30/60°) triangle cavity and runs adjacent to the ruler cavity in the second portion of the hollow body **128**. The magnetic lock **340** attaches the set square thirty/sixty-degree (30/60°) triangle **106** inside the cavity.

Element **490** shows a set square forty-five-degree (45°) triangle **108** in a closed position magnetically attached and stored in a set square forty-five-degree (45°) triangle cavity and runs adjacent to the set square thirty/sixty-degree (30/60°) triangle cavity in the second portion of the hollow body **128**. The magnetic lock **340** attaches the set square forty-five-degree (45°) triangle **108** inside the cavity.

As shown in the elements **460**, **470**, **480**, **490** a protractor **102**, a ruler **104**, a set square thirty/sixty-degree (30/60°) triangle **106**, and a set square forty-five-degree (45°) triangle **108** in a closed position are all of the same length, width and thickness. As such they can be magnetically attached and stored inside any cavity in a second portion of the hollow body **128**.

FIG. **5** illustrates an example top view and front view **500** of a multifunctional writing device **100**, showing steps to open and close a protractor **102**, according to some embodiments.

As seen in FIG. **5**, the principle of operation is similar to opening and closing a handheld folded fan, containing slats, around a pivot.

The components of the protector **102** are shown in the top view **512**. It consists of the first rectangular strip **501** containing thin slats, a second rectangular strip **502**, and a pivot pin **503**. The thin slats are made up of leaves with ribs or slips. In a fully open position, the leaves will form a semicircle with angle measures in degrees.

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The protractor **102** slats revolve around a pivot pin **503** to open or close.

The steps to open a protractor **102** are as follows:

1. First remove the cap **124** from multifunctional device **100** by slightly twisting it to the left.

2. Pull the protractor **102** by grasping the accessible rectangular strip top portion **134** with fingers, from multifunctional device **100**. The top view **512** of the protractor **102** shows the first rectangular strip **501** with thin slats, a second rectangular strip **502**, and a pivot pin **503**.

3. Hold the protractor **102** in front face view **514** position.

4. The protractor **102** first rectangular strip **501** with thin slats can be opened around a pivot pin **503** by rotating it to the right side as shown in elements **516**, **518** and **520**.

5. In a fully open position, the protractor **102** is in semicircle form as shown in element **520**. A protractor **102** is attached in an open position by a magnetic lock **360** around a pivot pin **503**. A magnetic lock **360** mechanism attaches protractor **102**, first rectangular strip **501**, and second rectangular strip **502** around pivot pin **503** in the open position ensuring it remains locked during use.

The protractor **102** is attached in an open position by a magnetic lock **360** around a pivot pin **503**.

The protractor **102** can be closed by following the steps 3, 4 and 5 in reverse order and then inserting and storing it in any of the 4 empty cavities in the second portion of the hollow body **128**.

FIG. 6 illustrates an example top view and front view **600** of a multifunctional writing device **100** showing the steps to open and close a ruler **104**, according to some embodiments.

As seen in FIG. 6, the principle of operation to open ruler **104** is similar to opening of a bifold door around a hinge.

The components of the ruler **104** is shown in the top view **612**. It consists of rectangular strips **601**, **602** and a hinge **603**. In a fully open position, the rectangular strips form a ruler **104** marked at regular intervals in order to draw straight lines or measure distances.

The ruler **104** has a bifold hinge **603** between two rectangular strips **601**, **603** to open or close.

The steps to open a ruler **104** are as follows:

1. First remove the cap **124** from multifunctional device **100** by slightly twisting it to the left.

2. Pull the ruler **104** by grasping with fingers accessible rectangular strip top portion **134** from multifunctional device **100**. The top view **612** of the ruler **104** shows first rectangular strip **601**, a second rectangular strip **602**, and a pivot pin **603**,

3. Hold the ruler **104** in the front face view **614** position.

4. The ruler **104** can be opened around a hinge **603** by pulling the first rectangular strip **601** and second rectangular strip **602** against each other as shown in the elements **616**, **618** and **620**.

5. In a fully open position, the ruler **104** is in rectangular form as shown in element **620**. A ruler **104** is attached in an open position by a magnetic lock **360** around a hinge **603**. A magnetic lock **360** mechanism attaches ruler **104** first rectangular strip **601** and second rectangular strip **602** around hinge **603** in the open position, ensuring it remains locked during use.

The ruler **104** is attached in an open position by a magnetic lock **360** around a bifold hinge **603**.

The ruler **104** can be closed by following the steps 3, 4 and 5 in reverse order and then inserting and storing it in any of the 4 empty cavities in the second portion of the hollow body **128**.

FIG. 7 illustrates an example top view and front view **700** of a multifunctional writing device **100** showing steps to

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open and close a set square thirty/sixty-degree (30/60°) triangle **106**, according to some embodiments.

FIG. 7 illustrates the opening and closing of a set square thirty/sixty-degree (30/60°) triangle **106**. The principle of operation to open a set square thirty/sixty-degree (30/60°) triangle **106** is similar to that of opening arms, which can be opened or closed around two pivots.

The components of the set square thirty/sixty-degree (30/60°) triangle **106** is shown in the top view **712**. It consists of rectangular strips **701**, **702**, **703** and pivot pins **704**, **705**. In a fully open position, the rectangular strips form a set square thirty/sixty-degree (30/60°) triangle **106** with the aim of providing a straightedge at a right angle or other particular planar angles to a baseline.

The set square thirty/sixty-degree (30/60°) triangle **106** two rectangular strips **701**, **702** revolve around two pivot pins **704**, **705** to open or close.

The steps to open a set square thirty/sixty-degree (30/60°) triangle **106** are as follows:

1. First remove the cap **124** from multifunctional device **100** by slightly twisting it to the left.

2. Pull the set square thirty/sixty-degree (30/60°) triangle **106** by grasping accessible rectangular strip top portion **134** with fingers from multifunctional device **100**. The top view **712** of the set square thirty/sixty-degree (30/60°) triangle **106** shows rectangular strips **701**, **702**, **703** and pivot pins **704**, **705**.

3. Hold the set square thirty/sixty-degree (30/60°) triangle **106** in front face view **714** position.

4. The set square thirty/sixty-degree (30/60°) triangle **106** first rectangular strip **701** can be opened by being rotated towards the right position around the pivot pin **704** and second rectangular strip **702** can be opened by rotating it towards the left position around the pivot pin **705** as shown in elements **716**, **718** and **720**.

5. In a fully open position the set square thirty/sixty-degree (30/60°) triangle **106** is in triangle form as shown in element **720**. A set square thirty/sixty-degree (30/60°) triangle **106** is attached in an open position by a magnetic lock **360** around pivot pins **704**, **705** and around the top edges. A magnetic lock **360** mechanism attaches the set square thirty/sixty-degree (30/60°) triangle **106** right side by the first rectangular strip **701** and third rectangular strip **703** around pivot pin **704** in the open position. Similarly, a magnetic lock **360** attaches the left side second rectangular strip **702** and third rectangular strip **703** around pivot pin **705** in the open position. The magnetic lock **360** also attaches the first rectangular strip **701** and second rectangular strip **702** around top edges in the open position.

The set square thirty/sixty-degree (30/60°) triangle **106** is attached in an open position by a magnetic lock **360** around two pivot pins **704**, **705** and top edges of **701**, **702**.

The set square thirty/sixty-degree (30/60°) triangle **106** can be closed by following the steps 3, 4 and 5 in reverse order and then inserting and storing it in any of the 4 empty cavities in the second portion of the hollow body **128**.

FIG. 8 illustrates an example top view and front view **800** of a multifunctional writing device **100** showing steps to open and close a set square forty-five-degree (45°) triangle **108**, according to some embodiments.

FIG. 8 illustrates the opening and closing of a set square forty-five-degree (45°) triangle **108**. The principle of operation to open a set square forty-five-degree (45°) triangle **108** is similar to that of opening of arms, which can be opened or closed around two pivots.

The components of the set square forty-five-degree (45°) triangle **108** is shown in the top view **812**. It consists of

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rectangular strips **801**, **802**, **803** and pivot pins **804**, **805**. In a fully open position, the rectangular strips form a set square forty-five-degree (45°) triangle **108** with the aim of providing a straightedge at a right angle or other particular planar angles to a baseline.

The set square forty-five-degree (45°) triangle **108** two rectangular strips **801**, **802** revolve around two pivot pins **804**, **805** to open or close.

The steps to open a set square forty-five-degree (45°) triangle **108** are as follows:

1. First remove the cap **124** from multifunctional device **100** by slightly twisting it to the left.

2. Pull the set square forty-five-degree (45°) triangle **108** by grasping the accessible rectangular strip top portion **134** with fingers, from multifunctional device **100**. The top view **812** of the set square forty-five-degree (45°) triangle **108** shows rectangular strips **801**, **802**, **803** and pivot pins **804**, **805**.

3. Hold the set square forty-five-degree (45°) triangle **108** in front face view **814** position.

4. The set square forty-five-degree (45°) triangle **108** first rectangular strip **801** can be opened by being rotated towards the right position around the pivot pin **804** and second rectangular strip **802** can be opened by being rotated towards the left position around the pivot pin **805** as shown in elements **816**, **818** and **820**.

5. In a fully open position the set square forty-five-degree (45°) triangle **108** is in triangle form as shown in element **820**. A set square forty-five-degree (45°) triangle **108** is attached in an open position by a magnetic lock **360** around pivot pins **804**, **805** and around the top edges. A magnetic lock **360** mechanism attaches the set square forty-five-degree (45°) triangle **108** right side by the first rectangular strip **801** and third rectangular strip **803** around pivot pin **804** in the open position. Similarly, a magnetic lock **360** attaches the left side second rectangular strip **802** and third rectangular strip **803** around pivot pin **805** in the open position. The magnetic lock **360** also attaches the first rectangular strip **801** and second rectangular strip **802** around top edges in the open position.

The set square forty-five-degree (45°) triangle **108** are attached in an open position by a magnetic lock **360** around two pivot pins **804**, **805** and top edges **801**, **802**.

The set square forty-five-degree (45°) triangle **108** can be closed by following the steps 3, 4 and 5 in reverse order and then inserting and storing it in any of the 4 empty cavities in the second portion of the hollow body **128**.

FIG. 9 illustrates an example front view **900** of a multifunctional writing device **100** showing steps to open and close a compass needle **110**, and ways to access the stylus **120** and pen **122**, according to some embodiments.

FIG. 9 consists of detail working of compass needle **110**, stylus **120** and pen **122**.

Element **910** illustrates the opening of a compass needle **110** method. The principle of operation is similar to hand-held divider which can be opened around a pivot pin **901**.

Element **912** shows a compass needle **110** attached and stored in a compass needle cavity in the first portion of the hollow body **128**. A magnetic lock **340** mechanism attaches the compass needle **110** to the compass needle cavity in the first portion of the hollow body **128**.

The compass needle **110** revolves around a pivot pin **901** to open or close.

The steps to open a compass needle **110** are as follows:

1. Press the compass needle push button **130**, to release the compass needle **110** as shown in element **914**.

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2. Pull the compass needle **110** by grasping with fingers and pulling the needle portion outward from multifunctional device **100** as shown in element **916**.

3. The compass needle **110** is held to any open position by the screw on the hinge which attaches the compass needle **110** in its position. The hinge stiffness around pivot pin **901** ensures compass needle **110** to remain open at the desired arc length during use as shown in element **918**.

The compass needle **110** can be stored inside the cavity by simply pushing it towards the hollow body **128**.

The compass needle **110** is attached by a magnetic lock **340** and stored in a compass needle cavity in the first portion of the hollow body **128**.

Element **920** illustrates how to access the stylus **120** and pen **122**.

The tip of the second portion of the hollow body **128** comprises an eraser cap **124** over a tip of the pen **122** system.

The eraser cap **124** also comprises a stylus **120**.

As shown in element **922**, the eraser cap **124** contains eraser **118**, stylus **120** and tip of the pen **122**. Eraser **118** can be used for removing pencil-material and/or ink writing from paper. Eraser **118** can be included in a removable cap over writing instrument pen **122**. Eraser **118** can be made from synthetic rubber, synthetic soy-based gum, vinyl, plastic, or gum-like materials.

Element **922** shows the tip of the second portion of the hollow body **128** comprising an eraser cap **124** over a tip of the pen **122** system.

Element **924** shows how a stylus **120** can be accessed by removal of an eraser **118** section by simple anti-clockwise twist.

Element **926** shows how a pen **122** can be accessed by removal of the entire eraser cap **124** with simple anti-clock twist.

FIG. 10 illustrates another example front view **1000** of a multifunctional writing device **100** showing a USB flash drive **116**, according to some embodiments.

The USB flash drive **116** is stored in the first portion of the hollow body **128** of the multifunctional writing device **100**. The pen **122** and pencil **112** can be separated into two pieces near the bottom of the USB flash stick **116** by a simple twist around the screw thread **132**. USB flash drive has standard USB male plug for data storage. Inside the small casing is the hardware circuitry to store data and communicate with the USB male plug.

CONCLUSION

A multifunctional writing device comprising a hollow body, wherein the hollow body comprises one or more cavities configured to store a protractor, a ruler, a set square thirty/sixty-degree ($30/60^\circ$) triangle, a set square forty-five-degree (45°) triangle, a compass needle, a USB flash drive, a stylus, and an eraser. All of these multifunction writing devices components are stored in a single tubular housing.

A first writing member comprises lead and a mechanical pencil system being provided in a first portion of the hollow body. A second writing member comprising a pen system being provided in a second portion of the hollow body.

A magnetic lock attaches and stores a protractor, a ruler, a set square thirty/sixty-degree ($30/60^\circ$) triangle, a set square forty-five-degree (45°) triangle, and a compass needle inside a cavity.

A protractor, a ruler, a set square thirty/sixty-degree ($30/60^\circ$) triangle, and a set square forty-five-degree (45°) triangle are removed from a cavity by pulling rectangular strip top portion and used independently.

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Example embodiments allow the user to store multifunctional writing devices in a single tubular housing and quick removal from the storage cavity with effortless methods to open and close a tool. The multifunctional writing device is light weight and can be used on paper and paperless medium.

Although the present embodiments have been described with reference to specific example embodiments, various modifications and changes can be made to these embodiments without departing from the broader spirit and scope of the various embodiments.

The invention claimed is:

1. A multifunctional writing device comprising:

a hollow body, wherein the hollow body comprises one or more cavities configured to store a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, a compass needle, a USB flash drive, a stylus, and an eraser;

a first writing member comprising a first writing tip, wherein the first writing member comprises lead and a mechanical pencil system being provided in a first portion of the hollow body, and wherein the first writing tip is axial with respect to the hollow body;

a second writing member comprising a second writing tip, wherein the second writing member comprises pen system being provided in a second portion of the hollow body, and wherein the second writing tip is axial with respect to the hollow body, and wherein the first portion of the hollow body is at an opposite end of the second portion of the hollow body;

a pivot pin system which allows to open or close a protractor, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, and a compass needle;

a hinge system which allows to open or close a ruler;

a magnetic lock which attaches and stores a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, a set square forty-five-degree (45°) triangle, and a compass needle inside a cavity;

a magnetic lock which attaches a protractor around a pivot pin, a ruler around a hinge, a set square thirty/sixty-degree (30/60°) triangle around two pivot pins and top edges, and a set square forty-five-degree (45°) triangle around two pivot pins and top edges in an open position;

wherein a magnetic lock is formed when a permanent magnet object attaches itself to a ferromagnetic material made object; and

wherein a magnetic lock is formed when two permanent objects with opposite polarities attach to each other.

2. The multifunctional writing device of claim 1, wherein a protractor is magnetically attached and stored in a protractor cavity in the second portion of the hollow body.

3. The multifunctional writing device of claim 2, wherein a ruler is magnetically attached and stored in a ruler cavity and runs adjacent to the protractor cavity in the second portion of the hollow body.

4. The multifunctional writing device of claim 3, wherein a set square thirty/sixty-degree (30/60°) triangle is magnetically attached and stored in a set square thirty/sixty-degree

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(30/60°) triangle cavity and runs adjacent to the ruler cavity in the second portion of the hollow body.

5. The multifunctional writing device of claim 4, wherein a set square forty-five-degree (45°) triangle is magnetically attached and stored in a set square forty-five-degree (45°) triangle cavity and runs adjacent to the set square thirty/sixty-degree (30/60°) triangle cavity in the second portion of the hollow body.

6. The multifunctional writing device of claim 5, wherein a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, and a set square forty-five-degree (45°) triangle in a closed position is magnetically attached and stored inside any cavity in a second portion of the hollow body.

7. The multifunctional writing device of claim 6, wherein a protractor, a ruler, a set square thirty/sixty-degree (30/60°) triangle, and a set square forty-five-degree (45°) triangle are removed from a cavity by pulling rectangular strip top portion.

8. The multifunctional writing device of claim 7, wherein a protractor slats revolve around a pivot pin to open or close.

9. The multifunctional writing device of claim 8, wherein a protractor is attached in an open position by a magnetic lock around a pivot pin.

10. The multifunctional writing device of claim 9, wherein a ruler has a bifold hinge between two rectangular strips to open or close.

11. The multifunctional writing device of claim 10, wherein a ruler is attached in an open position by a magnetic lock around a bifold hinge.

12. The multifunctional writing device of claim 11, wherein a set square thirty/sixty-degree (30/60°) triangle two rectangular strips revolve around two pivot pins to open or close.

13. The multifunctional writing device of claim 12, wherein a set square thirty/sixty-degree (30/60°) triangle is attached in an open position by a magnetic lock around two pivot pins and top edges.

14. The multifunctional writing device of claim 13, wherein a set square forty-five-degree (45°) triangle two rectangular strips revolve around two pivot pins to open or close.

15. The multifunctional writing device of claim 14, wherein a set square forty-five-degree (45°) triangle are attached in an open position by a magnetic lock around two pivot pins and top edges.

16. The multifunctional writing device of claim 15, wherein a compass needle revolves around a pivot pin to open or close.

17. The multifunctional writing device of claim 16, wherein a compass needle is attached by a magnetic lock and stored in a compass needle cavity in the first portion of the hollow body.

18. The multifunctional writing device of claim 17, wherein the tip of the second portion of the hollow body comprises an eraser cap over a tip of the pen system.

19. The multifunctional writing device of claim 18, wherein an eraser cap comprises a stylus.

20. The multifunctional writing device of claim 19, wherein a USB flash drive is stored in the first portion of the hollow body.

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