Nov. 23, 1971 G. E. WHITCOMB 3,621,690

KEY RETAINER

Filed April 15, 1970

FIG. 1

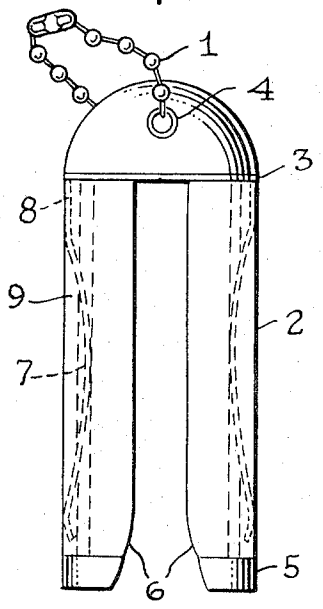
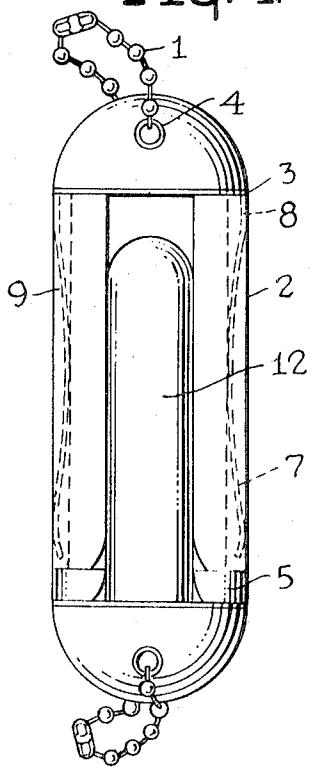


FIG. 4.



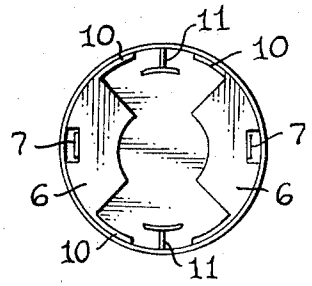
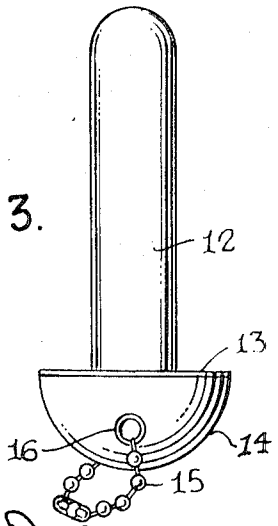


FIG. 2.

FIG. 3.



INVENTOR.

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KEY RETAINER

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ABSTRACT OF THE DISCLOSURE

A two piece key retainer or the like held together by magnetic attraction and mechanical friction.

This invention relates to a key retainer and/or keys retainer and/or items retainer.

More particularly it relates to a two part key and/or keys retainer in which one part is male and a second part is female, so made that the two pieces may be easily separated or readily placed together so that a key or other item may be placed on one of the separate pieces and used on that piece or where the two pieces may be placed together with a key or item on only one of the two pieces of the device or where two keys or two items may be placed on the device, one on either the male or female part of the device so that the keys or other items may be used separately or readily placed together or where more than one key or one item may be on either the male or female part of the device or on both pieces of the retainer when they are placed together or where keys or items may be separated by means of a key retainer as one key and no key, as one key and one key, as one key and several keys or as several keys and several keys.

The novelty of this invention is the way in which the two parts of the device, a male and a female part, are held together by the mechanical friction of one part with the other part and/or by the magnetic attraction of one part with the other part with sufficient energy to hold the male and female pieces together until they are pulled apart.

Further novelty is in this invention through the way in which the male part is readily separated from the female part through a single action by merely pulling the two pieces apart with sufficient energy to cause them to disengage one from the other.

The foregoing indicates that one of the objects of my invention is to provide a device that may be used as a keyholder whereby any one or more keys connected with the keyholder may be readily separated from another key or group of keys on either of the two pieces of the device.

While the following statement is not intended to limit this invention, a description of use may well be seen in the rapid separation of an automobile ignition key with one piece of the device from another key or keys on a second piece of the device, the ignition key thus being left in the automobile while other keys of locked glove compartments, trunks, etc. may be kept by the auto driver to prevent losses from the locked spaces.

A further novel object of this invention is to provide a method for keeping two parts of this device together so that a key and a key or a group of keys and a group of keys on the two parts, the male and female portions, of the device may be kept together with sufficient magnetic force and/or constraining force of mechanical pressure and friction to hold the two parts together until such time as they may be intentionally separated by pulling them apart.

Uniqueness is displayed in this invention by the particular way in which the magnets of this invention are

controlled so as to float forward under spring pressure and by magnetic attraction toward a center line only so far as a provided restrictive device allows them to move. Subsequently they will be pressed away from the center line as the male plug of the device is placed into the female part.

These and other objects of my invention which will be pointed out in more detail hereinafter, I accomplish by that certain construction and arrangement of parts of which I shall now describe exemplary embodiments:

Reference is made to the drawings forming a part hereof;

FIG. 1 is a cut away drawing of the female part of this device.

FIG. 2 is an open top view of the female part of the device showing the particular parts by that view.

FIG. 3 is a drawing of the male part of the invention.

FIG. 4 shows the appearance of the device when closed.

Reference is now made to FIG. 1 where **1** is a conventional ball chain complete with an opening link so that keys may be added thereon or taken away. **2** is a cap for the female part of the key holder and includes a cylinder that extends over the parts of this piece of the holder. **3** is a disc made of non-magnetic plastic or other material unattracted in a magnetic field placed above the magnets to hold them in place at that point. **4** is an opening provided through both sides of the cap so that a ball chain might be inserted therethrough. **5** is a non-magnetic ring installed at the bottom of the device to hold the magnets in place at that point. **6** are the two pieces of floating permanently magnetized metal each surrounded at the back, on two sides and at each end with nonmagnetic metal or other non-magnetic material leaving the innermost arc or surface of each magnet exposed so that the magnetism of each inside magnetic arc or surface might be utilized. **7** indicates a metal spring leaf of which there are two, the central portion of which is inserted into a squared indentation that extends the length of the magnet adjacent to or at the back median line of each of the movable magnets farthest from the center of the female part and adjacent to and against the cylinder wall. **8** indicates a weld or other fixing means to hold the spring at the top while the other end of the spring is loose, allowing it to adjust to the movement of the polygon shaped magnets as the male part of this device is inserted into or removed from the female part so as to cause the polygon shaped magnetized steel pieces to expand apart or to contract together. **9** indicates the non-magnetic covering of the surfaces of three sides and at each end of each magnet. These non-magnetic surfaces therefore do not interfere with the work of the exposed, permanently magnetized surfaces adjacent to the center of the female part of this device.

Refer now to FIG. 2; a top view of the female part of this invention where **6** indicates the floating magnets with indentations shown at the rear of each. **7** shows the springs from this view. **10** indicates the four non-magnetic extensions attached to the magnets and that run the full length of each magnet on either side and act as guides in holding the movable magnets in place. **11** illustrates two T angle bars that are opposite each other and that extend to approximately the same length as that of each magnet. Said T bars being attached for the full length of their bases to the inside of the cylindrical body **2**.

Referring now to FIG. 3;

12 is a cylindrical rod rounded on the end and made of steel so as to be readily attracted by the magnetic fields between the two magnets. **13** is a disc attached directly to the male rod of this device. **14** is a cap attached directly to disc **13**. **15** is a ball chain complete with an open-

ing link and **16** is a hole through both sides of the cap so that the chain might be inserted therein.

FIG. 4 is an illustration of the closed key retainer with each part securely held together by mechanical friction and/or by magnetic attraction.

The key retainer that I have described, then, is a two piece key retainer, the two parts of which may be held together by mechanical friction of one part with the other or which may be held by the magnetic attraction of one part for the other or by a combination of mechanical friction and magnetic attraction with both forces applied at the same time.

While the illustrations and writings indicate the two magnets as longitudinal cubic polygon arcs and the male portion as a round and cylindrical rod, these dimensional illustrations are not intended to limit the spirit of my invention since the metal pieces indicated in FIGS. 1 and 2 as No. **6** may well be formed as rectangular, square or other shaped polygons, while the male portion of FIG. 3 No. **12** might well be shaped of rectangular, square or other shaped polygons easily inserted into the female portion of the device by means of a rounded, pointed, pyramidal or other end shape to sufficiently reduce the end size for easy insertion of the part.

While the illustrations and writing indicate that the two magnets or metal pieces indicated in FIGS. 1 and 2 as No. **6** receive their mechanical pressure from leaf type metal springs illustrated in FIGS. 1 and 2 as No. **7**, these springs are not intended to limit the spirit of my invention since the mechanical pressure might well be accomplished by use of properly spaced and anchored coil springs.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A two piece device wherein one piece and its constituents form a male part and wherein a second piece and its constituents form a female part and wherein two members of the female part are longitudinal, cubic, arced polygons, each of which are magnetized with the magnetic field being exposed on each at an inner surface only while all other surfaces, two ends and three sides are surrounded by non-magnetic material placed directly on the polygons, said two polygons are held in place by a restrictive piece adjacent to the top of the body that contains the movable polygon members of the female piece and wherein the said two polygons are held in place at the bottom or opening of the female piece by a restrictive peripheral shelf leaving an aperture sufficiently large to accommodate insertion of a rod on the male part, these said restrictions at both top and bottom being spaced so that they allow free movement of each of the polygon shaped magnets toward a common center, this movement of each of the magnets being guided by non-magnetic extensions on either side of each of them for the full length of the polygon shaped magnets said extensions beyond either side of each magnet being great enough to go behind the top bar of a T of which there are two attached opposite each other onto the inside wall of the outside body of the female piece of this device, said T being long enough to extend a length equal to that of each magnet and here the aforementioned extensions of the two polygon shaped magnets go behind either side of the head of the two T bars which restrict and guide both the spring propelled, floating magnets which are so restricted that the spring pressure at the back of each of them cannot push them too close together and so that the aperture between the two magnets when forced most closely together will be great enough for easy insertion of the rod of the male piece of this device, thus the floating, magnetized, longitudinal, cubic arced polygons are restricted from coming together and come only close enough so that the male piece of the device may be easily inserted between the magnets where they then exert pressure on either side of the male rod so that the mechanical friction along with magnetic attraction may hold the two pieces together until they are pulled apart.

2. A two piece key retainer, or the like, composed essentially of a female part and a male part, said male part includes a cylindrical rod rounded at the top for easy insertion into the female part and made of highly attractable metal when in a magnetic field, said female part surrounded by a cylinder that encloses around the sides of the device of the female constituents and with means for attaching keys to either the male or female parts and whereby both the male and female parts and their constituents may be held together by magnetic attraction created by two longitudinal, cubic polygon arcs in the female part, each being sufficiently magnetized so that their respective magnetic fields have enough attraction to hold the rod of the male part when it is inserted between the two magnets of the female part and whereby the male and the female parts may further be held together by mechanical friction created by the said two cubic polygons in the female part being forced toward a center line of the device through pressure created by a curved metal leaf spring inserted behind each at a point furthest from the center of the female part, the central curved portion of each spring leaf being inserted into a squared indentation that extends for the length of each described magnetic polygon at the back median line of each of these movable magnets farthest from the center of the female part and only adjacent to the outside cylinder wall at the curved portion of the spring leaf and against the cylinder wall at the top where said spring leaf is welded to the inside of the cylinder wall at the top and where the spring leaf is against the cylinder wall at the spring's extreme other end but where it is unwelded and free to move in order that the curved portion of the spring at the rear of each cubic arced polygon exerts spring pressure and causes the polygon to press forward against the male rod of the device when it is inserted to create mechanical friction and close magnetic attraction to hold the two parts of the device together until greater energy is exerted to pull them apart.

3. A two part device with means for attaching keys or the like to either of the parts, wherein one part and its constituents form a male part and wherein the second part and its constituents form a female part and wherein the male part includes a cap and means for attaching keys and the like to it and further includes a cylindrical steel rod rounded on the far end from the cap so that the rod may readily be inserted into the female part and wherein the female part is constituted of a cap and means for attaching keys and the like along with a cylinder that surrounds the female internal parts and forms a cover therefor and wherein two members of the female part are longitudinal cubic polygons arced on the entire length of each of their innermost surfaces to allow snug fitting of the cylindical rod of the male part when it is inserted into the female part whereupon the male rod is held firmly between the two longitudinal cubic arced polygons by mechanical friction created by arched, tempered metal spring leaves of which there are two placed opposite each other inside the cylinder of the female part and each fixed in place at the top by a weld while the far end of each spring is loose, and while the arched portion of each tempered spring fits into a squared indentation that runs the length of each polygon at the back median line of each, allowing it to adjust to the movement of the polygon shaped female pieces as the male part is inserted into the female part or removed therefrom so that by way of such movement and by way of the spring tension on each of the arced polygons as the rod is inserted to spread the two polygons apart from each other and whereupon the snug fit of the male rod into the two arced polygons and the tempered spring pressure is more than sufficient to hold the pieces together by mechanical pressure and friction.

4. A two part key retainer in which one part is male and a second part is female, the male part being made of a cap with means for attaching keys thereto and of an elongated cylindrical, magnetically attractable steel rod

having the far end from the cap rounded to allow easy insertion in order to enter the female part and having a female part made of a cap with means for attaching keys thereto and of a cylindrical outside body extending to a non-magnetic ring installed internally in the outside cylinder adjacent to the bottom thereof and farthest from the cap to which the cylinder is attached at the top said non-magnetic ring holding in place two pieces of floating permanently magnetized metal which form longitudinal cubic polygon arcs, each surrounded at the back and on two sides and at each end with non-magnetic material leaving the innermost arced surface of each magnet exposed so that the magnetism of each inside arc might be utilized to attract and hold in placed the attractable steel rod of the male part when it is inserted between the two longitudinal cubic polygon arcs in the female part each being sufficiently magnetized so that their dual magnetic fields occurring in their entire length have sufficient magnetic attraction to hold the rod of the male part when it is inserted, said attraction being further aided by the close tolerance between the two arcs in the polygons and the rod which they surround and by the close proximity between the male and female parts created by pressure of two tempered leaf springs attached to the cylinder adjacent to the top thereof and curved to create pressure from the weld to their far end where they are free to move as pressure is applied against them or removed from them, said springs at their curved portion being inserted into squared slots that extend the length of the two magnetic longitudinal cubic polygon arcs at a point farthest from the center of the female part, thus the cylindrical steel rod of the male part fitting snugly into the arcs of the female part and most closely fitting by reason of spring pressure as described is additionally held in placed by magnetic attraction so that keys and the like on either end of this device may be attached together or easily separated for use.

5. A two piece key retainer comprising a male piece that has a cap through which is attached a ball chain with opening and closure so that keys may be attached thereon and extending from the cap is a cylindrical metal rod highly attractable to a magnetic field and said key retainer is further composed of a female part with a cap of the same diameter as that of the male part and also with means for retaining keys, said cap including a cylinder that extends over inside parts of the female part and a non-magnetic ring said ring holding in place two arced, magnetized, longitudinal polygon magnets, each surrounded at the back, on two sides and at each end with non-magnetic material so that only the magnetized innermost arcs of each of the magnets are exposed, the two magnets being concave arced on the inside and convex curved on the outside, said magnets having a squared notch at the outermost center part of each convex arc to accommodate an arched spring leaf that is attached to the top inside of the forementioned cylinder by a weld and which is free at its furthermost end to allow free movement as pressure is applied when the rod of the male part is forced into the female part to separate the two arced, magnetized, longitudinal, polygon magnets, whereby the easy entrance of the male rod between the magnets the non-magnetic ring at the bottom of the forementioned cylinder of the female piece forms a restrictive peripheral shelf with an opening sufficiently large to accommodate insertion of the male rod whereupon even though under spring pressure the two polygon magnets are held in place and guided by non-magnetic extensions on either side of each of them for their full length, said extensions beyond either side of the magnets being great enough to go behind the top bar of a T of which there are two attached opposite each other onto the inside wall of the outside body or cylinder of the female piece, said T being long enough to extend the length of each magnet and the aforementioned extensions of the two polygon shaped magnets go behind either side of the head of the two T bars which restrict and guide both the spring propelled, floating magnets which are so restricted that the spring pressure at the back of each of them cannot push them so close together that the aperture between the two magnetic polygons when forced most closely together will still be great enough for easy insertion of the male rod for its full length whereupon the cap of the male part will fit against the bottom of the female cylinder to close the device, thus the floating, magnetized longitudinal arced polygons are so controlled as to allow easy insertion of the male rod into the two arcs of the magnets whereupon the two floating spring impelled magnets exert pressure on either side of the male rod so that the snug fit of the arcs pressured against the sides of the magnetically attractable metal of rod by tempered leaf spring pressure against the magnets so that very positive mechanical friction along with magnetic attraction is combined together as contrived to form a machine that will retain keys on either of its two pieces and hold them together until sufficient energy is exerted to pull them apart.

6. A two piece device wherein one piece and its constituents form a male part and wherein a second piece and its constituents form a female part and wherein two members of the female part are magnetized longitudinal cubic polygons concave arced on their innermost surface and convex arced on their most outer surfaces and include squared slots that extend the length of each magnet at a point farthest from the center of the female part to accept a curved portion of a spring leaf so installed that its spring pressure will push the magnets toward the center of the device to hold a rod of said male part when said rod is inserted between the two arced magnets with the magnetic field being exposed on each at the inner concave arced surface only while all other surfaces, two ends and three sides are surrounded by non-magnetic material placed directly on the polygons, said two polygons are held in place by a restrictive piece adjacent to the top of the body that contains the movable polygon members of the female piece and wherein the said two polygons are held in place at the bottom of the female piece by a restrictive peripheral non-magnetic shelf leaving an aperture sufficiently large to accommodate easy insertion of the male rod, these said restrictions at both top and bottom being spaced so that they allow free movement of each of the magnets being guided by non-magnetic extensions on either side of each of them for the full length of the polygon shaped magnets said extensions beyond either side of each magnet being great enough to go behind the top bar of a T of which there are two attached opposite each other onto the inside wall of the outside body of the female piece of this device, said T being long enough to extend a length equal to that of each magnet and here the aforementioned extensions of the two polygon shaped magnets go behind either side of the head of the two T bars which restrict and guide both the spring propelled, floating magnets which are so restricted that the spring pressure at the back of each of them cannot push them too close together and so that the aperture between the two magnets when forced most closely together will be enough for easy insertion of the cylindrical rod of the male piece which is also rounded on the end for further ease of insertion, thus the floating, permanently magnetized longitudinal cubic arced polygons are restricted from coming together and come only close enough so that the male rod of the device may be easily inserted into the inner concave arcs of the magnets where they then exert pressure on either side of the male rod so that the mechanical friction created by close fitting arcs of the polygons around the rod and by spring pressure exerted on each of the polygons along with their magnetic attraction hold the two pieces together as described and whereby at the same time an item or items attached to a holding means on the male part may be held together with an item or items attached to the holding means on the female part and whereby the item or items on either of the parts may

be separated by merely pulling apart the male piece from the female piece.

7. A two piece device, each piece containing a cap to which is attached means for holding intrinsic or extrinsic materials and means for holding the two pieces together whereupon items held would be on either end of the device when the two pieces are placed together by inserting an elongated, magnetic attractable metal rod of one piece into the second piece between two movable permanent magnets that have concave arcs on their innermost sides to snugly fit the rod when it is inserted and wherein the magnets are further aided to snugly fit the rod for 80% to 100% of its entire length by pressure centralized at the rear of the magnets by a tempered leaf spring that is contracted by force when the rod of the first piece of the device is inserted between the magnets of the second piece, then the snugly fitting elongated magnets by their attraction in close proximity with the metal rod holds the two

pieces together so that two snugly fitting elongated, concave arced magnets snugly fitting said rod and applying its magnetism thereto holding the two pieces of the described device together so that the two pieces may then keep together intrinsic or extrinsic materials on each end of this device until the two pieces are pulled apart.

References Cited

UNITED STATES PATENTS

2,438,231	3/1948	Schultz	401—244
2,901,278	8/1959	Robinson	292—251.5
3,127,653	4/1964	Budreck	24—201

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U.S. Cl. X.R.

24—201 B, 230 F