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## **An Improved Bi-Functional Pen**

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### **Abstract**

In the present invention we are discussing about an improved pen in which a pen and pencil has been put together as a single product. A pencil holder is available inside the pen on the other end it has holding capacity of at least 5 to 6 needle. The pen part is movable in a circular direction for opening and closing the ball point tip. The pencil part is opened or closed by pushing the pen clip. Pen and pencil can be easily separated apart from each other as per the requirement. The improvement of mechanical multifunctional pen-pencil is very fancy in designing as per consumer compatibility and convenient. This multifunctional pen-pencil is highly durable and flexible for compact usage.

### **Introduction**

Publication No. CN202528663 (U) relates to the utility model discloses a double-ended pen, belonging to working and learning tools. The double-ended pen, the pen is provided with two ends, one end is provided with an ink refill and the other end is provided with a pencil lead.

Publication No. CN2104758 (U) relates to the multi-purpose pen has a single pen type and a double-pen type; the multi-purpose pen is characterized in that the lower surface of the pen of the single pen type is the pencil section adopting a cone wall to adjust the length of the lead; the upper surface of the pen of the double-pen type on which the eraser and the ruler needle are clamped is provided with a ball pen, or a fountain pen etc.

The present invention is mechanical multifunctional pen-pencil in which having an inbuilt holder inside the pen. In present scenario it is most advance mechanical multifunctional pen-pencil because in this a pen and pencil are put together in a single product with inbuilt holder. The pen part is movable in a circular direction for opening and closing the ball point tip. The pencil part is opened or closed by pushing the pen clip. Pen and pencil can be easily separated from each other as per requirement. This multifunctional pen-pencil is very useful for architecture and general purpose.

The objective of the present invention is to provide a pen with a pencil as a single product, at the other end which is simple in construction, strong, durable, compact, light weight, attractive in

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appearance and it can be manufactured at a low cost. It is easy to operate and ready for convenient use at all times. Pen and pencil can be separated from each other as and when required. This product is easy to use for writing and saves time and extra pencil requirement.

### Description of The Related Art:

A number of multifunctional pens with mechanical pencils are available. In one kind of pen, simply turn the pen until the function that you require is uppermost and press the top button. To retract, press the black button on the clip. The ballpoint pens can be replaced with 0.7mm needlepoint refills.

Another type of multifunctional pen is fitted with three tip selections – black ballpoint, red ballpoint and 0.5mm pencil. The ballpoint tips are colored red and black so you know which is which. There is a small emergency use eraser under the top cap. You have to unscrew the cap to get at it. To refill the pencil or replace the ballpoint cartridges you simply pull the top half of the body away from the bottom half to reveal the internals.

### Methodology of Design:

The present invention provides an improved pen in which a pen and a pencil are put together in a single product. A pencil holder is available inside the pen for carrying extra pencil needle. This holder can be carrying at least 5 to 6 needle inside the pen. The inbuilt holder eliminates extra pencil holder requirement. The pen part is movable in the circular direction for opening and closing the ballpoint tip. The pencil part is opened or closed by pushing the clip. When using the pencil part, the pen clip is pushed in forward direction and pencil needle can be moved inside again by pushing the needle by a single finger pressure. Also in this invention, the pen clip can be used in carrying the pen inside the shirt's pocket. In the pen part, 0.5 mm refill and in the pencil part 0.7 mm pencil needle can be used. Pen and pencil can be easily separated from each other as per requirement.

**In a preferred embodiment of the present invention**, the pen comprises four parts: the first part comprises a primary and a secondary cover which consists of a circular bearing at the end of the pen body; the second part has a cylindrical inbuilt holder; the third part of the pen body comprises lower side circular thread and upper side circular pushing material; the fourth part of the pen body comprises one metallic circular steel at the end of the upper side of the pen body (circular steel has 0.7mm circular hole) and the lower side consists of a slot. In between the slot, one rubber holder is attached with the cylindrical pipe.

**In another embodiment of the present invention**, the second part of the pen body comprises the lower end which is the grip holding portion; this portion is connected to the secondary cover of

the refill. The upper side of the pen is circular with an internal thread which is connected to the third part of the pen body which is used to lock the inbuilt holder.

**In yet another embodiment of the present invention**, the tail cover of the refill is provided with a circular hole and an external thread. This circular hole is used to connect the tail side of the refill through pushing action and the external thread is used to connect the primary cover of the refill.

**In still another embodiment of the present invention**, the pen clip is connected with a cylindrical pipe. On the thick side of the cylindrical pipe there is a small cut through which the pencil needle is moved in forward and backward direction.

**In another embodiment of the present invention**, a helical spring is used on the thick side of the cylindrical pipe for proper movement of the pencil needle. This helical spring is useful for the movement of the pencil needle in forward and backward direction.

**In yet another embodiment of the present invention**, the cylindrical cover consists of a circular thread at the end of the cover side in which the helical spring and cylindrical pipe fit properly and is locked with the help of a copper circular ring.

**In still another embodiment of the present invention**, the pen comprises a rubber which is used for opening and closing the cylindrical pipe and also for erasing.

### DESCRIPTION OF DRAWINGS FOR THE PEN:

**It is to be noted, however, that the appended drawings illustrate only typical embodiments of this invention and are therefore not to be considered for limiting of its scope, for the invention may admit to other equally effective embodiments.**



Fig. 1 illustrates the ball point refill;

The standard ball point refill is used in the pen part section for writing purpose. This ball point refill is opened and closed by the circular movement of the body of the pen.

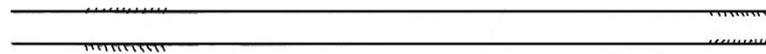


Fig. 2 illustrates the primary cover of the ball point refill;

The primary cover has an internal thread at the upper side and an external double thread at the end of the lower side. The ballpoint refill is inserted into the primary cover of the ballpoint refill.

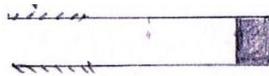


Fig. 3 illustrates Tail cover of the refill;

The tail cover has external thread at the end of lower side and it used for proper engagement with primary cover of the ball point refill.

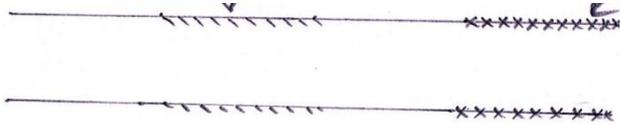


Fig. 4 illustrates secondary cover of the refill;

It is a cylindrical cover plate it has internal double thread at the end of lower side and knurling part at the end of upper side for grip portion to be used for pushing in the second part of the pen body.

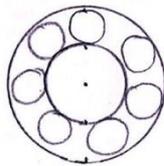


Fig. 5 illustrates the bearing;

The bearing is use for proper circular movement of ball point refill and it is engaged in first part of the body of pen.

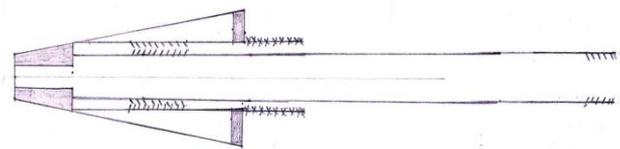


Fig. 6 illustrates first part of the body of pen with primary & secondary cover;

It is the assembling part of first part of the pen body with primary & secondary cover, it consist of circular bearing at the end of the pen body.

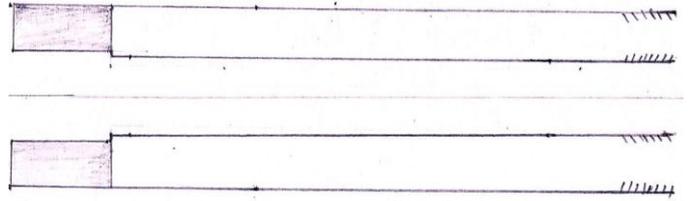


Fig. 7 illustrates second part of the pen body;

It is the second part of the pen body it have cylindrical inbuilt holder. At the lower side grip portion and upper side circular internal thread it is used for locking of inbuilt holder.

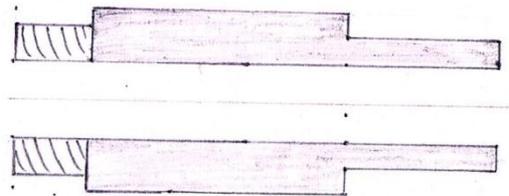


Fig. 8 illustrates third part of the pen body;

It is the third part of the pen body it consist of the lower side circular thread and upper side circular pushing material.

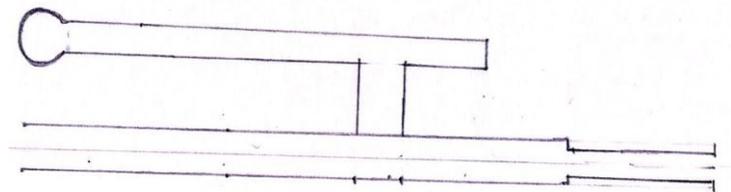


Fig. 9 illustrates cylindrical pipe with pen clip;

Pen clip is connected with cylindrical pipe though this pipe, pencil needler is move forward and backward direction at the upper side small cut for movement of pencil needle.

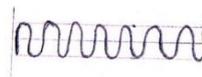


Fig. 10 illustrates helical spring;

The helical spring is used at the upper side of the cylindrical pipe for the movement of pencil needle in the forward and backward direction.

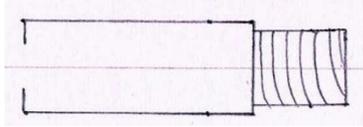


Fig. 11 illustrates cylindrical cover;

It is a cylindrical cover it consist of circular thread at the end of the upper side. In this cover helical spring and cylindrical pipe properly fit and lock with the help of copper circular ring.



Fig. 12 illustrates copper circular ring;

It is a copper circular ring it have circumference at the upper side is more than lower side and it is inserted in the cylindrical pipe and cylindrical cover for the proper movement of the pencil needle.



Fig. 13 illustrates rubber used for opening and closing of the cylindrical pipe;

This rubber is used for opening and closing of the cylindrical pipe. This rubber is also used for emergency eraser.

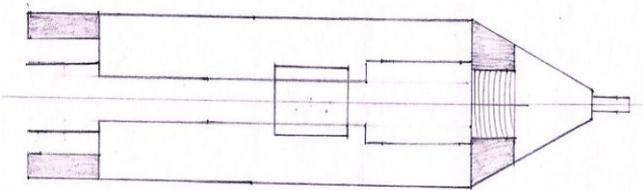


Fig. 14 illustrates fourth part of the body of pen;

It is a fourth part of the pen body it consist of one metallic circular steel at the end of the upper side of the pen body (circular steel have 0.7mm circular hole) and the lower side consist a slot, in between the slot one rubber holder is attach with cylindrical pipe. When inserting a new pencil needle, then pull the rubber and insert new needle and close it. The fourth part of the pen body consists of cylindrical pipe with pen clip and cylindrical cover (pen-pencil mechanism). At the middle portion of the cover one slot for pen clip. This pen clip is connected with the cylindrical pipe.

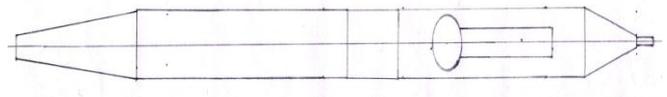


Fig. 15 illustrates the assembled pen.

This is an improved bi-functional pen after complete assembling. This improved bi-functional pen having an inbuilt holder which can carry 5 to 6 needle holding capacity.

**Description of The Preferred Embodiments:**

Accordingly, the present invention provides a multipurpose pen which can serve the purpose of both a pen and a pencil in a single product. A pencil holder is available inside the pen which can carry at least 5 to 6 needle holding capacity.

The pen body comprises a primary cover of the ball point refill (fig. 2) having double external thread (or single thread) and at the end of the cover there is a single internal thread. The tail cover of the refill (fig. 3) has a circular hole and an external thread. The circular hole is used to connect the upper side of the ball point refill (fig. 1) through pushing action and an external thread is used to connect the primary cover of the refill (fig. 2).

The secondary cover (fig. 4) is a cylindrical cover plate having internal double thread (or single thread) and knurling part for grip portion to be used for pushing the second part of the pen body (fig. 7). In the second part of the pen body (fig.7) there is a grip portion at the lower side for holding the pen.

The first part of the pen body comprises a primary and a secondary cover (fig. 6) which consists of circular bearing (fig. 5) at the end of the pen body. The second part of the pen body (fig. 7) has a cylindrical inbuilt holder. On the lower end side there is a grip portion and the upper end side has circular internal thread. This thread is used for connecting the third part of the pen body (fig. 8) for locking the inbuilt holder. The lower side of third part of the pen body (fig. 8) has a circular external thread and the upper side is a solid circular pushing material. The circular thread is used for a proper connection with second part of the pen body (fig. 7) and the solid pushing side is used for a proper connection with the fourth part of the pen body (fig. 14).

A pen clip is connected with the cylindrical pipe (fig. 9) having a helical spring (fig. 10) on the thick side. Though this pipe, the pencil needle is moved in a forward and backward direction. On the thick side there is a small cut for the movement of the pencil

needle. The helical spring (fig. 10) and the cylindrical pipe (fig. 9) fit properly in a cylindrical cover (fig. 11) consisting of circular thread at the end of the cylindrical cover (fig. 11) with the help of a copper circular ring (fig. 12).

The fourth part of the pen body (fig. 14) consists of metallic circular steel at the end of the upper portion of the pen body (circular steel having 0.7 mm circular hole) and the lower side consists of a slot. In between the slot, one rubber holder is attached with a cylindrical pipe. When inserting a new pencil needle, the rubber (fig. 13) is pulled out and is closed after inserting the needle. The middle portion of the cover has a slot for the pen clip. This clip is connected with the cylindrical pipe.

The secondary cover (fig.4) is first inserted in the first part of the pen body (fig.6) and at the end of the pen body corner a bearing (fig.5) is fixed which allows the rotation of the secondary cover in a circular direction. Only knurling portion is outside for gripping with the second part of the pen body (fig.7). After the complete engagement of the secondary cover (fig.4), the primary cover (fig.2) is properly inserted. The ball point refill (fig.1) is inserted in the primary cover (fig.2) and tightened with the help of the tail cover of the refill (fig.3). The whole engagement is properly inserted in the second part of the pen body (fig.7) and the upper side is tightened with the third part of the pen body (fig.8). The helical spring (fig.10) is then inserted on the thick side of cylindrical pipe (fig.9) and this cylindrical pipe (fig.9) is then inserted in the cylindrical cover (fig.11) and locked with the help of a copper circular ring (fig.12). This whole arrangement is inserted in the fourth part of the pen body (fig.14) and locked with the pen cover and outer thread of the cylindrical cover (fig.11).

The pen part is movable in the circular direction for opening and closing the ballpoint tip. The pencil part is opened or closed by pushing the clip. When using the pencil part, the clip is pushed in a forward direction and the pencil needle can be moved inside again by pushing the needle by a single finger pressure. Also in this invention, the pen clip can be used in carrying the pen inside the shirt's pocket. In the pen part, 0.5 mm refill and in the pencil part 0.7 mm pencil needle can be used. Pen and pencil can be easily separated from each other as per requirement.

**Numerous modifications and adaptations of the system of the present invention will be apparent to those skilled in the art,**

**and thus it is intended by the appended claims to cover all such modifications and adaptations which fall within the true spirit and scope of this invention.**

#### **I. ADVANTAGES OF BI-FUNCTIONAL PEN:**

1. A pen and pencil arrangement in a single unit comprising four parts: primary and secondary cover which consists of a circular bearing at the end of the pen body; a cylindrical inbuilt holder; lower side circular thread and upper side circular pushing material and a metallic circular steel at the end of the upper side of the pen body having a slot on the lower side to attach a rubber holder with a cylindrical pipe.
2. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the second part of the pen body has at its lower end, a grip portion and at the upper end a circular internal thread for locking the inbuilt holder.
3. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the pen comprises a tail cover of the refill having a single external thread wherein refill's tail side is inserted in the circular hole of the tail cover by pushing action.
4. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein a pen clip is connected with a cylindrical pipe through which the pencil needle moves in a forward and backward direction.
5. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the cylindrical cover consists of circular thread at the end of the upper side in which the helical spring and cylindrical pipe fit properly and is locked with the help of a copper circular ring.
6. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the pen comprises a rubber which is used for opening and closing of the cylindrical pipe and is also used for erasing.

7. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein pencil holder is available inside the pen which can hold 5 to 6 pencil needles.
8. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the pen part is movable in a circular direction for opening and closing the ballpoint tip.
9. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the pencil part is opened or closed by pushing the clip.
10. The pen and pencil arrangement in a single unit as claimed in claim 1, wherein the pen and pencil can be easily separated from each other as per requirement.

### Conclusion and Future Work:

The present invention provides an improved pen in which a pen and a pencil are put together in a single product with inbuilt holder. This inbuilt holder can carry at least 5 to 6 pencil needle holding capacity. The pen part is movable in the circular direction for opening and closing the ballpoint tip. The pencil part is opened or closed by pushing the pen clip. When using the pencil part, the clip is pushed in forward direction and pencil needle can be moved inside again by pushing the needle by a single finger pressure. Also in this invention, the pen clip can be used in carrying the pen inside the shirt's pocket. In the pen part, 0.5 mm refill and in the pencil part 0.7 mm pencil needle can be used. Pen and pencil can be easily separated from each other as per requirement. One internal emergency erase is used for erasing and it also use for opening and closing cylindrical pipe, for inserting pencil needle.

In future prospective, this multifunctional pen-pencil can be use for many purposes like writing and drawing. It is also very useful for architecture and it will be eliminate extra pencil holder requirement. It will be time saving multifunctional pen-pencil because pen and pencil both together in a single product.

The present invention is related to technical knowledge of mechanical engineering and mechanical designing concepts are used to improvement of multifunctional pen-pencil.

### Acknowledgment:

I would also like to deeply thank the various people at AMITY UNIVERSITY, NOIDA (U.P) who, during the period of my innovation, provided me with useful and helpful assistance. Without their care and consideration this report would not have

been completed. This invention "improved bi-functional pen" is already registered as a patent by the Amity University, Noida (U.P), application number is 3710/DEL/2013, invented by the Radheshyam Choudhury.

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