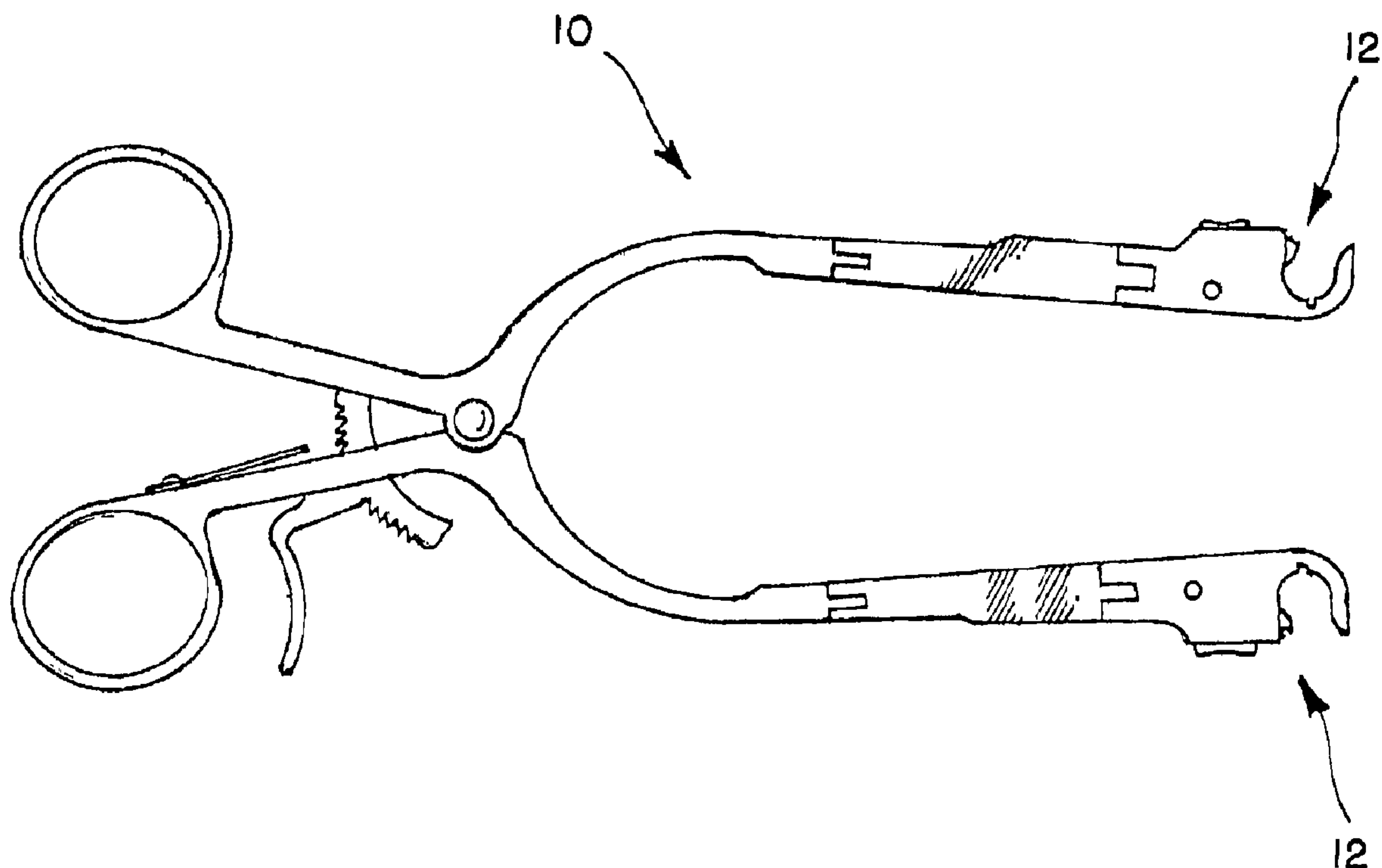




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(54) Titre : ECARTEUR CHIRURGICAL A CHARGEMENT LATERAL
(54) Title: SIDE LOADING SURGICAL RETRACTOR



(57) Abrégé/Abstract:

A surgical retractor (10) includes a side loading socket (12) configured to receive a connector head (14). A linearly moveable slide (20) retains the connector head (14) within the socket cavity (18). The slide (20) has a convex face (22) outwardly from the socket cavity (18) which assists in "snapping" in a connector head (14). A convex inner face (32) assists in retaining an inserted connector head (14). A notch (38) in the tip (30) of the slide (20) assists in preventing rotation of a connector head (14) having opposing locking pins (16) when one of the pins (16) is received in a recess (36) at the back of the socket cavity (18). A grip (40) is connected to the slide (20) which may move the slide (20) from a locked to a released position within a slot (26) in the socket (12) body.



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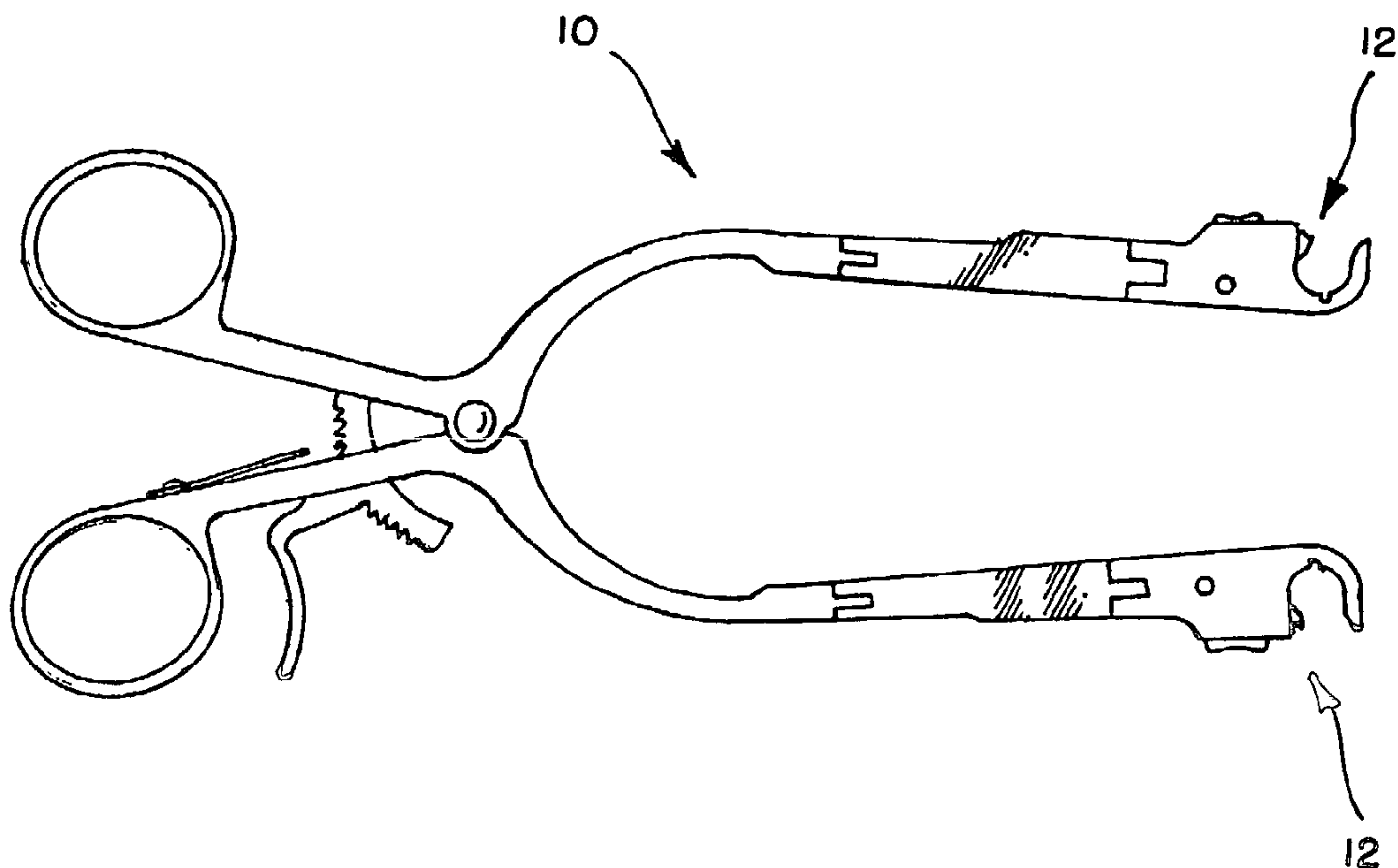
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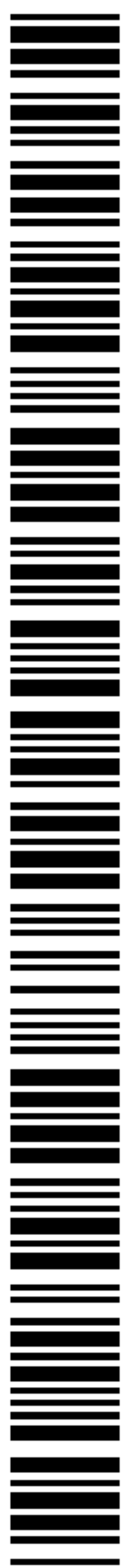
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(54) Title: SIDE LOADING SURGICAL RETRACTOR



(57) **Abstract:** A surgical retractor (10) includes a side loading socket (12) configured to receive a connector head (14). A linearly moveable slide (20) retains the connector head (14) within the socket cavity (18). The slide (20) has a convex face (22) outwardly from the socket cavity (18) which assists in "snapping" in a connector head (14). A convex inner face (32) assists in retaining an inserted connector head (14). A notch (38) in the tip (30) of the slide (20) assists in preventing rotation of a connector head (14) having opposing locking pins (16) when one of the pins (16) is received in a recess (36) at the back of the socket cavity (18). A grip (40) is connected to the slide (20) which may move the slide (20) from a locked to a released position within a slot (26) in the socket (12) body.



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SIDE LOADING SURGICAL RETRACTOR

Field of the Invention

[0001] The present invention relates generally to a surgical retractor apparatus used with interchangeable retractor blades. More particular the present invention relates to a surgical retractor with side loading interchangeable retractor blades.

Background of the Invention

[0002] When conducting some surgical procedures, it is often desirable to retract tissue. Although there are a number of procedures and devices available to retract tissue, U.S. Patent No. 6,042,540 allows for the top loading as well as the side loading of retractor blades into a socket. The side loading feature of this, and other prior art, is believed to be advantageous whereby the surgeon's vision is not obscured while connecting, or disconnecting a blade from a retractor. U.S. Patent No. 6,042,540 discloses a number of retractors which can utilize the blade of Figure 1A, specifically, the longitudinal retractor of Figure 3, the transverse retractor of Figure 4, and the side-loading hand-held retractor of Figure 5. As shown in Figures 1A and 1C, the blades typically have connector heads locking pins typically extend from opposite sides of the longitudinal axis of the connector head. Although U.S. Patent No. 6,042,540 specifically shows a top loading connector head, other connector heads also employ the opposing locking pin construction.

[0003] U.S. Patent No. 6,042,540 utilizes a "cam member" to restrain a connector head within a socket cavity. There are believed to be a number of problems with this design. First, cams are known in the art typically as: "a disc or cylinder having an irregular form such that its motion, usually rotary gives to a part or parts in contact with it a specific rocking or reciprocating motion or motions". In U.S. Patent No. 6,042,540, the rotation of the cam 130 about pivot 128 locks and unlocks the connector head from within the socket chamber. One of the perceived drawbacks of this "cam"

design is the release lever 124 rotates and extends away from the socket 12 as the cam is moved in and out of the socket chamber.

[0004] Another perceived problem with the design shown and described in U.S. Patent No. 6,042,540 is the cam is described as being positioned at least partially "within" a side loading socket. While this design appears to allow for the grip of the socket to tighten if a blade were to be attempted to be pulled side-ways out of the socket cavity, this tightening effect also would appear to cause an inserted connector head to bind instead of rotate within the socket cavity.

[0005] Accordingly, a need exists for an improved retractor design.

Summary of the Invention

[0006] A need exists for a surgical retractor which accepts blades having a connector head at least in a side loading manner.

[0007] Another need exists for a surgical retractor which securely retains connector heads in a socket.

[0008] Another need exists for a side loading surgical retractor socket which does not rely on an awkward cam mechanism.

[0009] Yet another need exists for a side loading surgical retractor socket which allows a connector head to "snap" in to a locked configuration without a need for an operator to manually operate a locking mechanism.

[0010] Accordingly, a surgical retractor includes a body having a socket for receiving a connector head. The socket has a slide which moves linearly toward and away from a connector head when positioned within the socket. A convex surface on a first face of the slide allows for the connector head to be pushed into position or "snapped" in, while a convex surface on a second face of the slide is believed to assist in retaining an inserted connector head in position within the socket. The second

face of the socket may also be constructed with a notch at a tip of the slide which allows pinned hubs to be received within the notch to resist turning in at least one direction. While the preferred embodiments accept only side loaded connector heads, other non-preferred embodiments could accept top loaded connector heads as well.

Brief Description of the Drawings

[0011] The particular features and advantages of the invention as well as other objects will become apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a top view of a side-loading retractor with the socket of Figure 2;

Fig. 2 shows a top perspective view of a surgical retractor socket of the present invention;

Fig. 3 is a top plan view of the surgical retractor of Figure 2 with a connector head in place and with some portions illustrated in phantom;

Fig. 4 is a top plan view of the surgical retractor of Figure 2 with the slide in a partially retracted position; and

Figure 5 is a side plan view of the slide taken along the line a-a of Figure 3.

Detailed Description of the Preferred Embodiment

[0012] Figure 1 illustrates a preferred embodiment of a surgical retractor **10** having at least one, and preferably two, sockets **12** as shown in Figures 2-5. Other retractor designs may also utilize the socket **12** of the present invention. The socket **12** of this design receives a connector head **14** in a side loading manner. In fact, at least one protuberance, such as one or more pins or ledge **16**, prevent a connector head **14** from being top loaded in the preferred embodiment as the ledge **16** extend into the socket cavity or chamber **18**. In alternative embodiments, top loading maybe allowed, such as if the ledge **16** is not provided, does not sufficiently extend within the socket chamber **18**, or otherwise.

The connector head shown and described in co-owned U.S. Patent No. 6,887,198 works well with the socket **12** of the preferred embodiment. The ledge **16** is preferably located internal in top **11** and bottom **13** of socket cavity.

[0013] Instead of using a rotating cam as shown and described in U.S. Patent No. 6,042,540 to secure a connector head within the socket chamber as shown in Figure 2, the preferred embodiment utilizes a linearly moving slide **20**. The slide **20** is moveable in a linear manner between a locked position as shown in Figure 3, and an unlocked position shown in phantom in Figure 4. Figure 4 also shows an intermediate position, such as might occur if a connector head **14** were "snapped" into position within the socket chamber **18** as will be described in further detail below.

[0014] The slide **20** has a first face **22** which is directed outward from the socket cavity **18**. The first face **22** is preferably convex so that when a connector head, which is traditionally cylindrical in shape, is pushed against the first face **22** and directed **24** toward the socket cavity **18**, the slide **20** is deflected into slot **26**. The slot **26** receives the slide **20** so that the slide **20** or other component does not extend further away from the socket **12** to potentially snag something.

[0015] Spring **28** normally biases the slide **20** into the locked position shown in Figure 2. Accordingly, when the bias of spring **28** is overcome by a connector head **14** being directed within the socket cavity **18**, the connector head **14** "snaps" into position since once the head clears the tip **30** of the slide **20**, it encounters second face **32** which is concave. The concave shape of the second face **32** is believed to be advantageous as it may allow for the circular shape of the socket cavity **18** to be continued so that a circle inscribed along the socket walls **34** would continue along the second face **32**. Furthermore the concave shape of the second face **32**, in the preferred embodiment, prevents the second face **32** from being positioned in the socket cavity **18**.

[0016] In the preferred embodiment, the slide 20 has been specifically designed so that it cannot even be partially positioned within the socket 12, as has been done in the prior art. The slide 20 is positioned external to the socket to retain a connector head 14 within the socket cavity 18. In fact the slide 20 may assist in defining the socket cavity 18, especially when the second face 32 of the slide 20 has a similar arc of curvature as the socket wall 34. In other embodiments, the slide 20 may extend into the socket cavity 18.

[0017] Adjacent to the socket cavity 18 is a recess 36 which may accept a fixing pin of a connector head. Furthermore, at the tip 30 and/or the first face 32 a notch 38 is located which accepts a second fixing pin of a connector head at least partially therein to assist in prevent the locking pin from rotating toward the slide 20. The illustrated notch 38 prevents the connector head 14 from rotating toward the slide 20 when locking pins, if utilized, are oriented toward the recess 36 and notch 38.

[0018] While the connector head 14 may be snapped into the socket cavity 18 as explained above, the slide 20 may be operated with the grip 40 which preferably has a textured surface 42 for ease of operation. The grip 40 may also be curved to accommodate a user's thumb or finger. The grip is connected to the slide 20 by arm 44. Movement of the grip 40 moves the slide 20 accordingly. The grip 40 is moveable along the socket 12, not away from the socket 12. The slide 20 is linearly moveable within the slot 26.

[0019] In order to assist in the construction of slot 26, a cutout 46 in the director 24 allows for the through machining of the slot 26. Additionally, a suture hole 48 may be provided in the socket body 50. As shown in Figure 1, a groove 52 along a top portion of the body 50 allows the arm 44 to access the slot 26. A similar groove may be located along the bottom portion of the body 50 with another arm.

[0020] It is anticipated that surgical retractors **10** such as the type shown in Figure 5 will utilize the socket of Figures 1-4. Other retractor types including longitudinal retractors such as the one shown in Figure 4 of U.S. Patent No. 6,042,540, and others, may also employ the socket design of the present invention.

[0021] While many aspects differentiate the preferred embodiment from the design shown and described in U.S. Patent No. 6,042,540, many aspects of this disclosure could be advantageously incorporated into that design as well to eliminate many

[0022] Numerous alternations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to the preferred embodiment of the invention which is for purposes' of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

Claims:

1. A surgical retractor comprising:
 - a retractor body having a side loading socket cavity for receiving a connector head;
 - a linearly displaceable slide configured to selectively retain and release a connector head within and from said socket cavity in a locking and a released position; and
 - at least one protuberance into said socket cavity preventing top loading of said connector head.
2. The surgical retractor of claim 1 wherein said slide has a first face outwardly oriented relative to said socket cavity having a convex surface.
3. The surgical retractor of claim 1 wherein said slide is spring biased in said locking position.
4. The surgical retractor of claim 1 further comprising a grip connected to said slide.
5. The surgical retractor of claim 4 wherein linear movement of said grip moves said slide linearly.
6. The surgical retractor of claim 1 further comprising a director, said director located substantially opposite said slide across the opening into said socket cavity.
7. The surgical retractor of claim 1 having a first face inwardly oriented relative to said socket cavity having a concave surface.
8. The surgical retractor of claim 7 wherein said socket cavity is at least partially bounded by socket walls and said first face has a similar arc of curvature as the socket walls.
9. The surgical retractor of claim 1 further comprising a longitudinal recess at a back of said socket cavity.
10. The surgical retractor of claim 1 wherein said slide operates along an operation axis perpendicular to a longitudinal axis through said connector head.
11. The surgical retractor of claim 10 where said operation axis of said slide does not intersect said longitudinal axis of said connector head.

12. A surgical retractor comprising:

- a retractor body having a side loading socket cavity for receiving a connector head;
- a linearly displaceable slide configured to selectively retain and release a connector head within and from said socket cavity in a locking and a released position; and
- a tip at end of said slide, and a notch at said tip, said notch configured to at least partially receive a locking pin of said connector head.

13. A surgical retractor comprising:

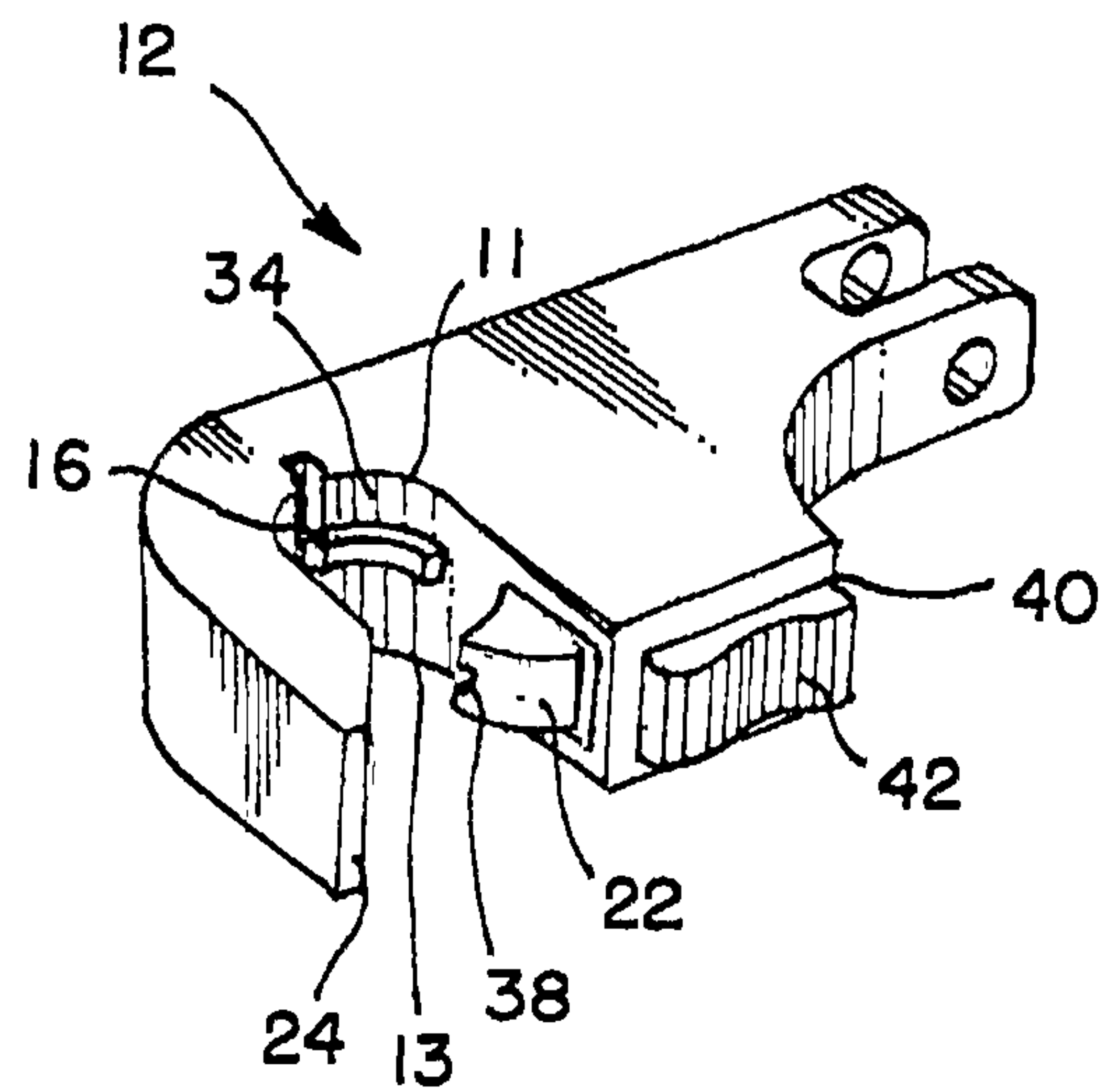
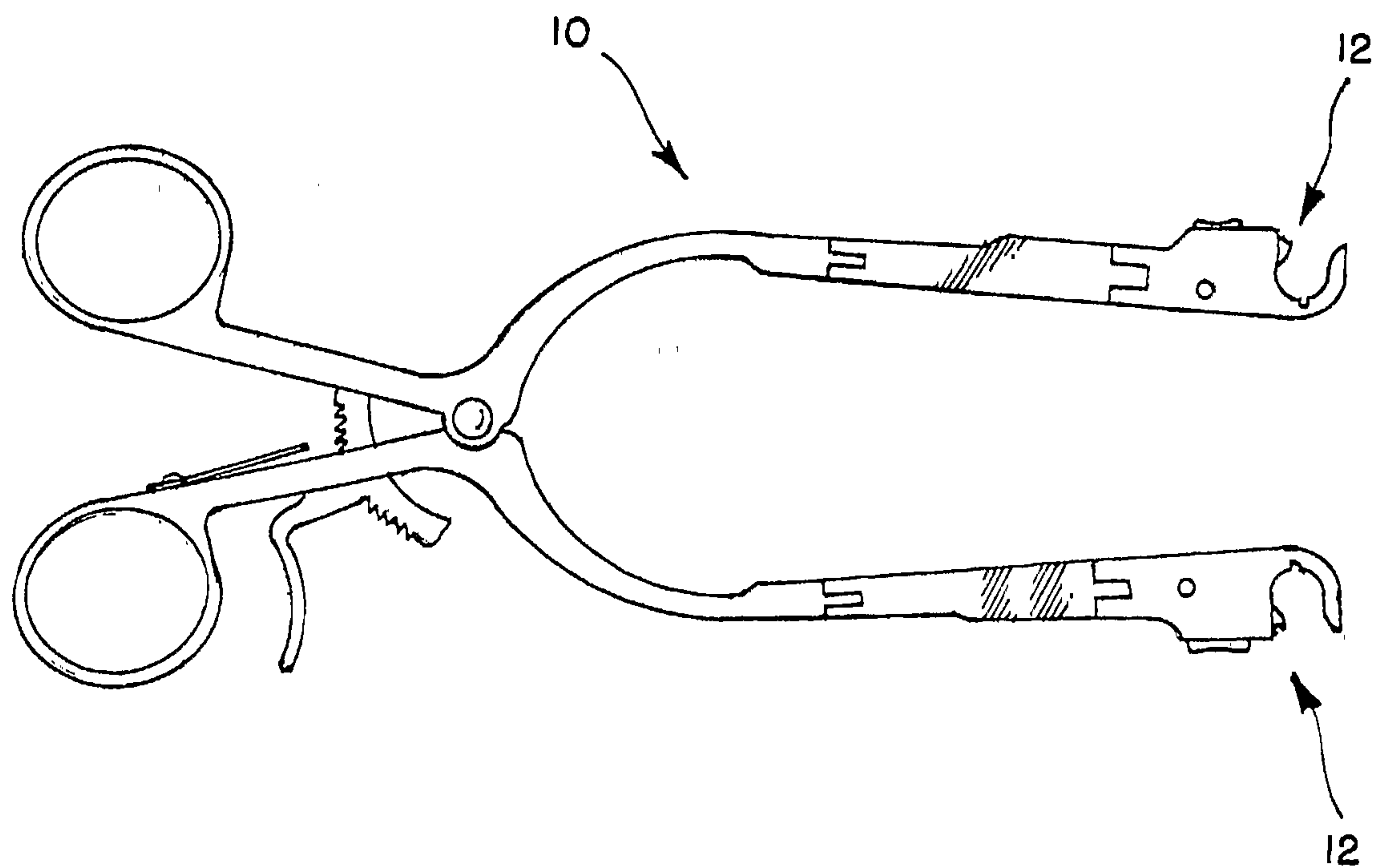
- a retractor body having a side loading socket cavity for receiving a connector head;
- a longitudinal recess at the back of said socket cavity;
- a linearly displaceable slide configured to selectively retain and release a connector head within and from said socket cavity in a locking and a released position; and
- a notch at a tip of the slide, said notch substantially opposite from said longitudinal recess in said locking position.

14. The surgical retractor of claim 13 wherein said slide retains and releases said connector head from sideways entry and removal.

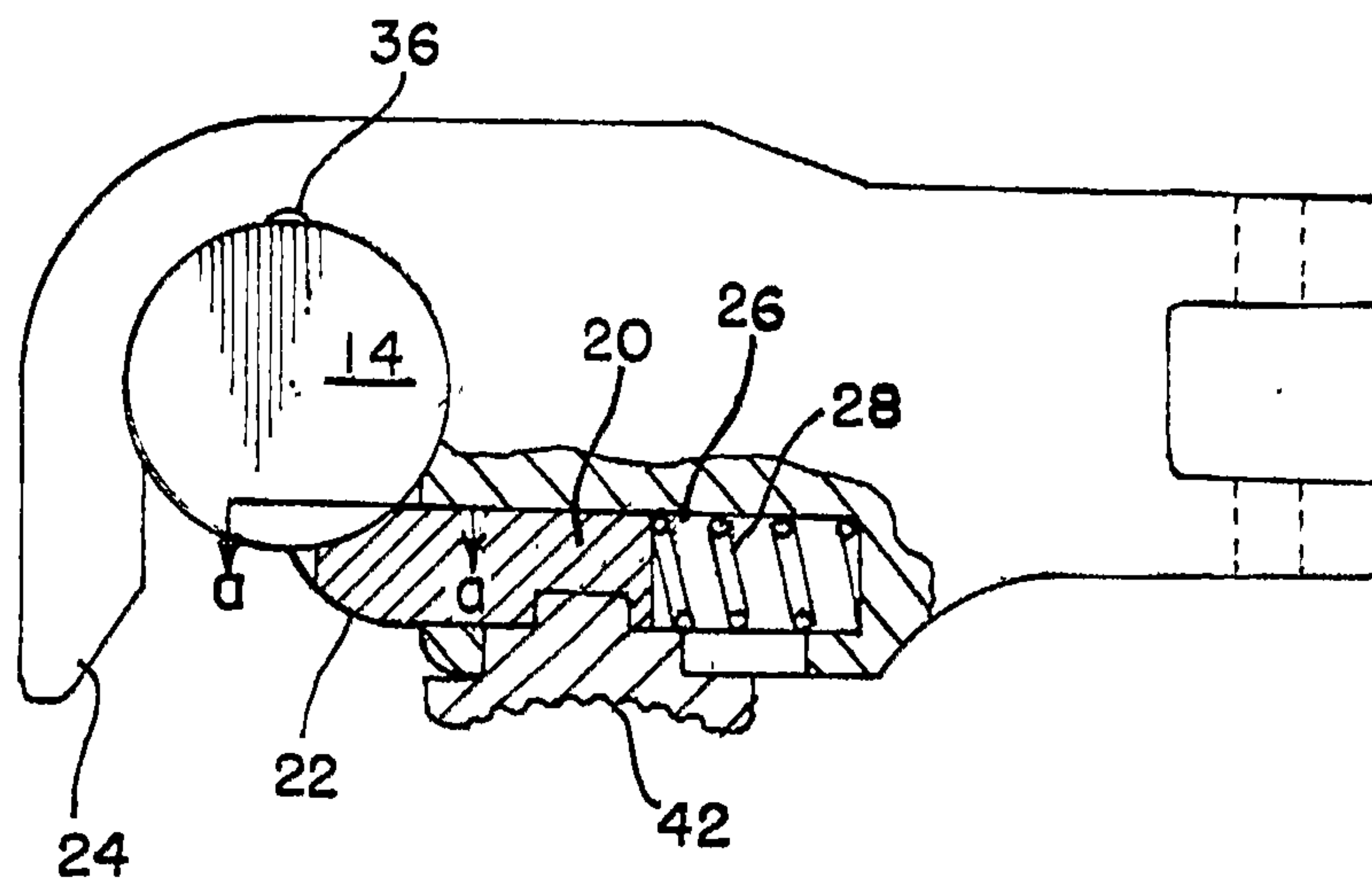
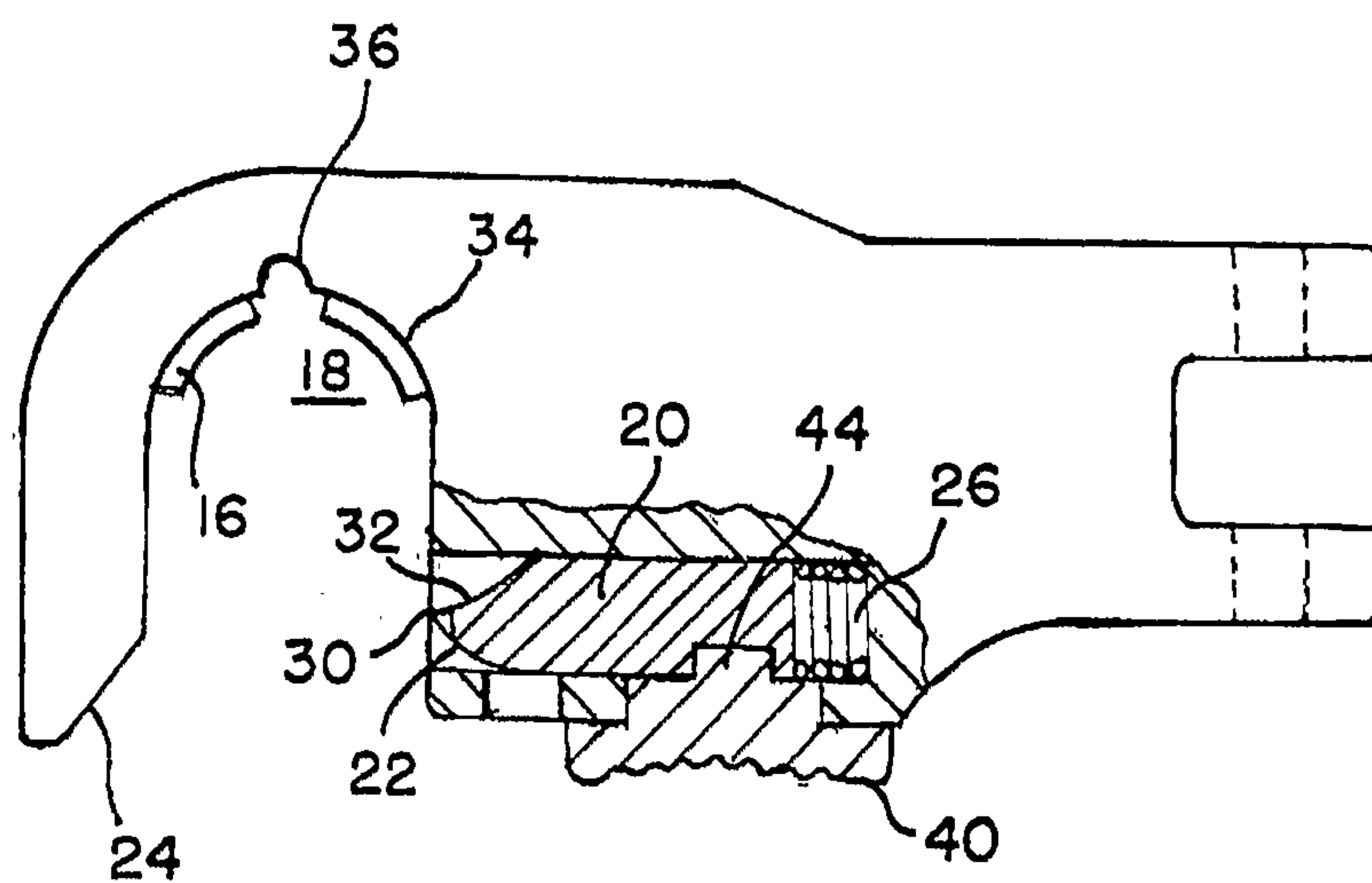
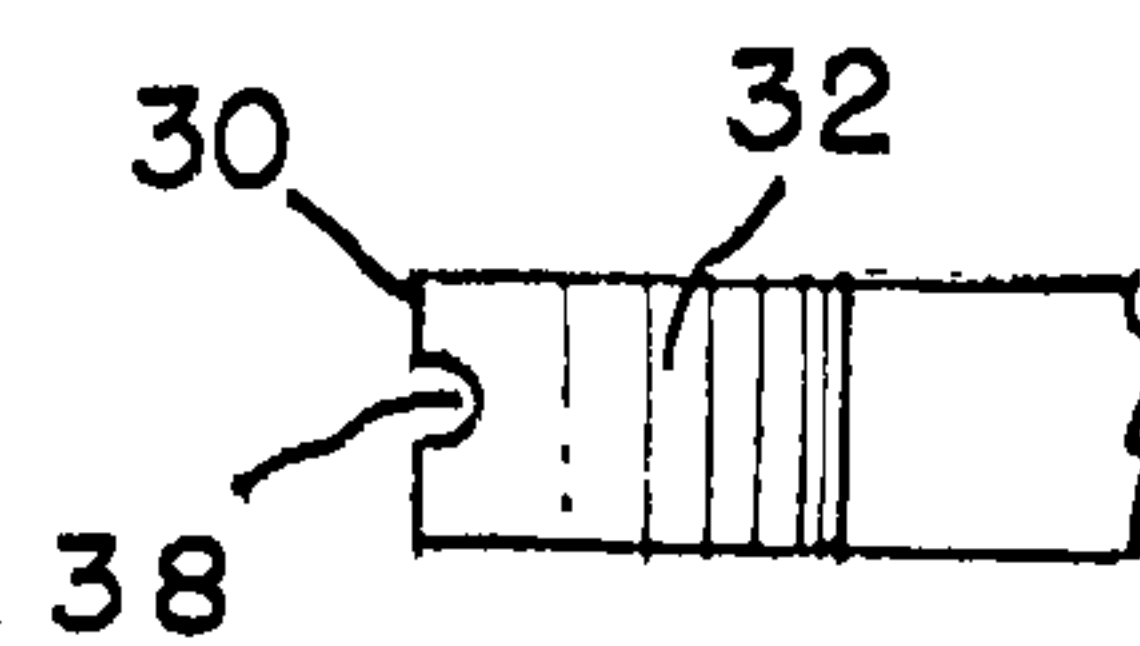
15. A surgical retractor comprising:

- a socket body having a side loading socket cavity for receiving a connector head;
- a slot within and surrounded by said socket body except at a slot opening into said socket body along an operation axis and a groove communicating with said socket body with an external portion of said socket body, said groove spaced from the socket opening by a portion of said socket body; and
- a linearly displaceable slide connected to an arm and configured to move at least partially within said slot in a locking and a release position to selectively retain and release a connector head within the socket cavity, said slide moved by said arm the extending through said groove into said slot.

16. The surgical retractor of claim 15 wherein said slide has a convex first face outwardly directed from said socket cavity and a concave second face inwardly directed to said socket cavity.

$\frac{1}{2}$ **FIG. 1****FIG. 5**

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**FIG. 2****FIG. 3****FIG. 4**

