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(72) Inventor; and

(71) Applicant: AKSAKAL, Orhan Seyfi [TR/TR]; Mutlukent Mah.1970 Sk. No:3/22, Ümitköy, 06810 Ankara (TR).

(74) Agent: MUTLU, Bigen; Ataç 1 Sk. No:31/25, Yenışehir, 06420 Ankara (TR).

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(54) Title: A RETRACTOR SYSTEM

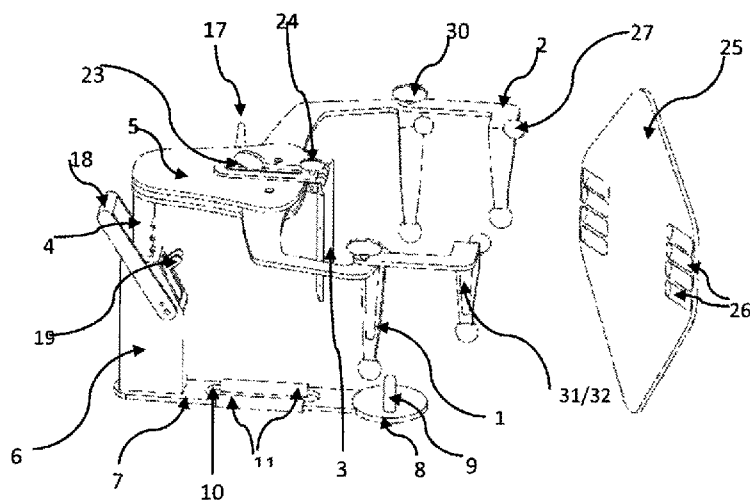


Figure-1

(57) Abstract: The invention relates to an abdominal retractor system using human body parts as support points by means of extension levers, and maintains approach to the surgical region by pressing abdominal wall downwards.



A Retractor System

Technical Field: The invention is related to an abdominal retractor system which uses human body parts as support by means of its extension levers.

5 Background of the invention: In existing retractor arrangements, it is not used to support another body region, such as vagina or back of the patient, to open the operating area in the abdomen or to push the abdominal wall edges toward the surgical point and facilitate the operation. In the present embodiments, a retractor draws a person from the surgical team or opens the abdominal wall only on either
10 side or receives support from the operating table.

Technical problems aimed to be solved by the invention: It minimizes the abdominal wall factor which complicates the operation, and eliminates excessive tugging to open the surgical field. Tissue trauma and postoperative pains are minimized. Therefore, the operation time is shortened and a greater advantage is obtained with
15 a small incision. The patient is discharged earlier from the hospital. It is pushed to the operating area by pressing the side down. This reduces the need for lateral opening. Therefore, the side of the operation can be kept smaller as the ailments and pains caused by the tension decrease.

Description of the figures:

20 The retractor system for achieving the object of the present invention is illustrated in the attached figures. These illustrations are illustrative and do not limit the purpose.

1. The upper oblique view of the entire assembly.
2. Top and bottom oblique views of the main retractors, table and the closing arm.
- 25 3. Vaginal arm and mechanism box-upper oblique view.
4. The upper oblique view of the extension retractors.
5. Oblique view of the front (bladder) retractor and movements.
6. The mode of movement of the main retractors and extension retractors and the structure of the release arm.
- 30 7. Mechanism box interior details – springs and arms – oblique view.
8. The operating system of the pull-down lever – side view
9. The function of releasing the arm and retractors from each other of the stop arm – side view.
- 35 10. It is the upper oblique view of the main retractor closing lever operation and the relation of the main retractors.

11. When the system is applied to the patient, its relation with the organ (cervix) – side view.
12. Upperoblique view of the urethral window supports silicone soft cervical fixation bar and the lower oblique view of the sensors.
- 5 13. Relation of the intestine retractor and stop protrusions – side and oblique view.
14. The application of the arm to the patient for fat patient and the appearance of a clamping system (ratchet bar clamp).
15. Side view of the approach with using ball nut and screw instead of threaded arm and mechanism.

10 Description of the references in the figures:

1. Main retractors
2. Extension retractors
3. Front retractor
4. Main retractor block gear bar
- 15 5. Table
6. Pull-down mechanism
7. Vaginal arm with soft padded urethral window
8. Cavity for cervix uteri
9. Cervical spur/protrusion
- 20 10. Urethral opening in the vaginal arm
11. Soft pillows
12. Threaded Rod Hole
13. Threaded rod blades
14. Threaded rod channel
- 25 15. Main retractors contact gear
16. Gear locking mechanism to prevent closure of main retractors
17. Anti-lock mechanism lever
18. Pull-down lever
19. Stop handle
- 30 20. Stop handle pressure spring
21. Pull handle
22. Pull handle spring
23. Front retractor forward-backward position fixing screw
24. Front retractor end section position fixing screw
- 35 25. Bowel retractor
26. Stop channels
27. Stop overhangs
28. Main retractor down-press zone
29. Main retractor round tip
- 40 30. Extension retractor clamping screw
31. Pressure / strain sensors
32. Power generator tips
33. Ball nut
34. Screw

45

Description of the invention:

In normal position; the main retractor (1), extension retractors (2), the front retractor (3), the threaded rod and the main retractor block gear bar (4) (figures 1,2, 6), which consists of a table (5) that holds them all together, and the pull-down mechanism (6),
5 the pitted vaginal arm (7) (figures 3, 7, 11, 12) is separated from one another. The vaginal arm (7) is inserted into the chamber and pushed forward. There's a cervix here. The vaginal arm (7) slides underneath it into the cavity (8) at the end of the cervix (figure 11). The protrusion at the end (9) also forms an additional fixation by entering the cervical canal (figure 11). There is an opening (10), such as an urethra
10 opening, on the vaginal arm (7) to prevent the urine tube from being crushed (figures 1, 3, 7). On both sides of this opening there are soft pillows (11) so as not to damage the container wall. Then, the gear bar (4) of the main retractor block in the closed position is inserted into the hole in the pull-down mechanism (12) connected to the vaginal arm (figure 1). The threaded rod blades (13), entering here, enter the channel
15 (14) (figures 7, 8, 9) through which they move up and down. It is pushed as far as it can be pushed. Thus, the vaginal arm (7), which carries the main retractor block and the mechanism, is pushed against one another and the main retractors are opened to one side in connection to the muscles on both sides. The main retractors (1) are associated with each other by means of a gear (15) and are opened to the same
20 degree (figure 6). Closing of the main retractors is prevented by a threaded locking mechanism (16) (figure 6). This mechanism has a lever (17). When this lever is pressed, the main retractors (1) can immediately be moved to their original positions (figure 10).

If the main movement of the main retractors towards the vaginal arm (7) is desired,
25 the lever (18) of the pull-down mechanism is pressed down to the end (figure 8). The stop handle (19) prevents from escaping upwards again. This arm (19) is always held in pressed form with a spring (20) in order to prevent back-flow. Each full downward movement of the mechanism arm (18) pulls down a shaft-driven pull handle (21) in the mechanism box. The shaft at the end of the traction arm is seated on a thread on
30 the threaded arm and is pressed against the threaded arm by means of a spring (22). The pull handle (21), seated on a thread, lowers main retractors (1) and the extension retractors connected to thereof by one thread (figure 8). The retractors will be lowered as much as needed by means of required motion. In case of a need for

removal of the retractor assembly from the vaginal arm, the stop lever (19) is pressed backwards (figure 9). A long screw mounted on the arm (7) can be adapted by means of a ball nut mounted on the plate (5) instead of the mechanism (6) and the gear lever (4) for the main retractor block to approach the arm (7).

- 5 There is a front retractor (3), which can be adjusted to the pubic bone, namely the forward-backward position fixation screw (23), in the region close to the bladder and the angle of the tip to the screw (24) (figure 5).

There are also extension retractors (2), which can be adjusted both downwards and sideways for wide abdominal operations extending upwards (figures 1, 4, 6). To keep
10 the bowels away from the surgical site, there is a compatible bowel retractor (25) (figures 1, 13). On the side of this retractor facing the main retractor system, there are stop channels (26) on both sides. The stop overhangs (27) at the end of the retractors enter those channels at the appropriate level. Since the channels are transversely long towards sides, they adapt to lateral opening of the retractor and the
15 bowel retractor (25) can maintain its position without sliding upwards (figure 13).

The body of the main retractors (1) and extension retractors (2) is wide and on the horizontal axis (28). Thus, it can easily lower the side abdominal walls downwards (figures 1, 2, 4, 6, 10) and open the wound edges sideways with a vertical extension (figures 1, 2, 4, 10, 11, 12, 14). The opening ends (29) are round and smooth so as
20 not to damage the organs (figures 1, 2, 4, 11). After the extension retractors are attached to the main retractor, the screw (30) is fixed by tightening (figures 1, 6, 12).

Outside the retractors (1, 2) namely, on the muscle contacting side of the vertical part which serves to open the wound to the sideways, there are pressure sensors (31) (figures 1, 11, 12). They give notice of loosening of the tissue by giving warning of
25 the tissue being squeezed and damaged thus, tissue is protected from being crushed. Furthermore, in the same sensor area, there are generators (32) that send special electric currents to loosen the abrupt muscle contractions that occur when the dose of the anesthetic drug decreases (figures 1, 11, 12).

For fat patients, the support of the current mechanism (6) and the arm (7) from the
30 vagina may not be sufficient. In this case, instead of the mechanism (6), one of the commercially available clamping systems will be adapted and the support will be

taken from the patient's back region, covered with a soft layer but with a wider and longer arm (7) (figure 14).

Industrial application of he invention:

5 The retractor system which serves to the above described purposes, can be produced, and used in the corresponding branch of the industry, and has a structure applicable to the medical sector.

CLAIMS

- 1) A retractor system, comprising a main retractor block as well as vaginal arm with with soft padded urethral window (7), including mechanisms (6) within a box.
- 5 2) A retractor system as per Claim 1, wherein the main retractor block includes main retractors (1), extension retractors (2), front retractor (3), main retractor block gear bar (4) and a table (5) for holding purposes.
- 3) A retractor system as per Claim 1, wherein the cervical spur (9) at the end enters into the cervical canal to maintain an additional fixation enabling the vaginal arm (7) to slide and include the cavity for cervix uteri (8).
- 10 4) A retractor system according to Claim 3, wherein the vaginal arm (7) has an uterhral opening (10) for uncrushing of the bladder pipe.
- 5) A retractor system according to Claim 4, wherein soft pillows (11) are available at both sides of the cavity (10) for protecting the chamber wall.
- 15 6) A retractor system according to Claim 1, whereas the main retractor block provides a threaded rod canal (14) where the said block moves within the threaded rod hole (12) enabling pushing of the vaginal arm (7) bearing the main retractor block, and the mechanism (6) to each other.
- 7) A retractor system according to Claim 6, wherein the main retractors (1) have a thread (15) for maintaining a similar degree of opening.
- 20 8) A retractor system according to Claim 7, wherein the main retractors (1) include a gear locking mechanism (16) to prevent closure of the said retractors.
- 9) A retractor system according to Claim 8, wherein the gear locking mechanism (16) has an anti-lock mechanism lever (17) for bringing the main retractors (1) back to their original positions.
- 25 10) A retractor system according to Claim 9, wherein the main retractors (1) include a stop handle (19) separating the main retractor block from vaginal arm (7) when pressed backwards, if needed, and which is hold active with being pressed by a spring (20) and preventing upward escaping again with pull down lever (18) for movement against vaginal arm (7).
- 30 11) A retractor system according to Claim 10, werein the pull down lever (18) includes a towing arm, which stands in the pressed form against female lever via pull handle spring (22) transmitting this action to main retractor block gear bar (4) by means of each full action downwards of the pull down lever (18).
- 35 12) A retractor system according to Claim 11, wherein the main retractors (1) and extension retractors (2) thereof include a pull handle (21), which is fixed on one of the gears at threaded bar (4), maintaining required reduction.
- 13) A retractor system according to Claim 2, wherein the said system provides a front retractor (3) at the region closer to the pubic bone, forward – backward position

of which is adjusted by a fixing screw (23) and end angle of which is adjustable with a screw (24).

- 5 14) A retractor system according to Claim 2, wherein the said system comprises extension retractors (2) and bowel retractor (25) required for wide abdominal operations.
- 10 15) A retractor system according to Claim 14, wherein, on the main retractor block facing side the said system further comprises stopping canals (26) enabling protection of the bowel retractors' (25) position without sliding upwards and where stop overhangs (27) enters as well as which can adapt to sideways opening of retractor at each and every degree at both sides.
- 15 16) A retractor system according to Claim 14, wherein the said system provides main retractors (1) and extension retractors (2) with vertical direction for opening injury edges sideways as well as main retractor down-press zone (28) located at horizontal axis and which has a wide body with sufficient protrusion to outwards from end for pressing side abdominal wall downwards easily.
- 17) A retractor system according to Claim 16, wherein the said system includes a pressing screw (30) fixing extension retractors (2) installed to the main retractor.
- 20 18) A retractor system according to Claim 14, wherein the said system comprises pressure sensors (31) warning for release in case of excessive pressing and damaging the tissue, at the muscle side, namely external side of the retractors (1, 2).
- 19) A retractor system according to Claim 18, wherein the said system further comprisses generators (32) sending special electrical currents at the muscle side namely, external side of the retractors (1, 2) for releasing abrupt muscle contractions due to the dosage reduction of the anesthetic drugs.
- 25 20) A retractor system according to Claim 18, wherein the said system provides a long arm (7), maintaining support from back region of the patient instead of mechanism (6) in case of insufficient support of mechanism (6) and arm (7) from vagina.
- 30 21) A retractor system as set forth in any of the preceding claims, wherein the said system includes a screw, installed onto the arm (7) and a nut, installed onto the table (5) instead of gear bar (4) and mechanism (6) in order to maintain approach of main retractor back to the arm (7).
- 35 22) A method according to Claims 1 and 16, wherein the process comprises a step of approaching the abdominal wall to the surgical point by applying pressure to the sideways of the surgical cuts at the abdominal region.

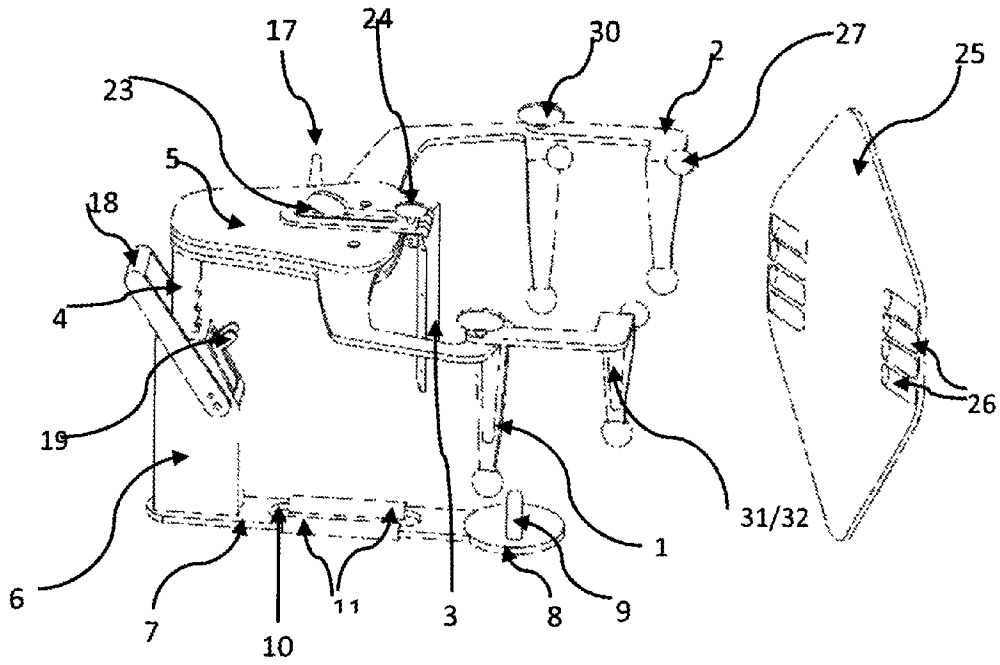


Figure-1

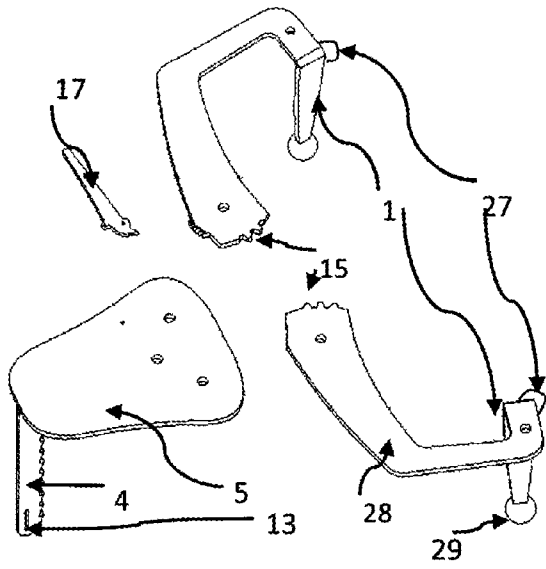


Figure-2

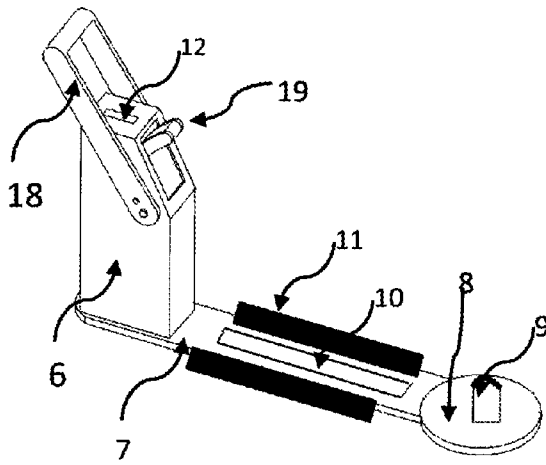


Figure-3

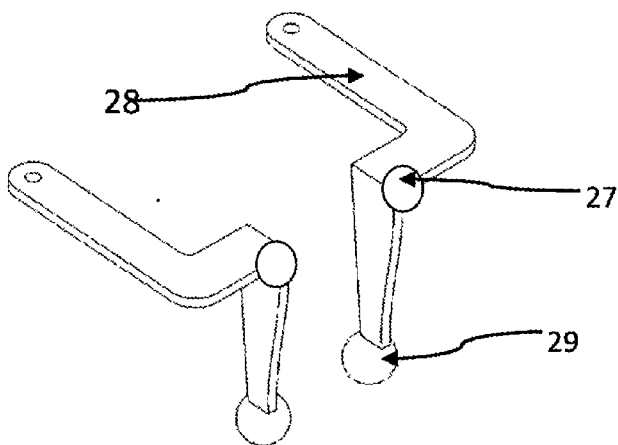


Figure-4

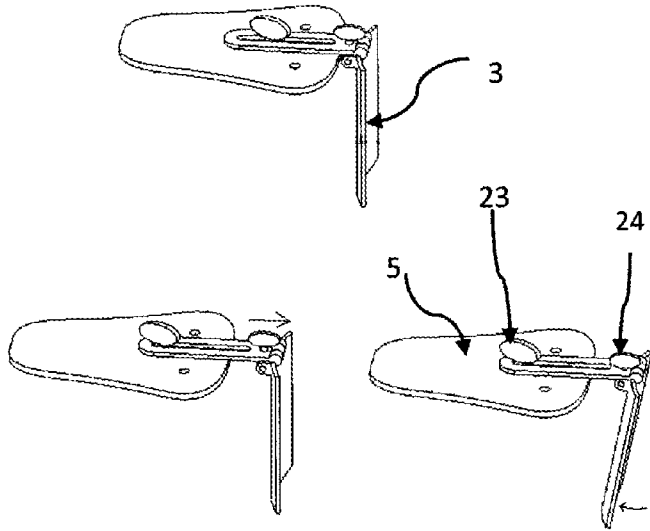


Figure-5

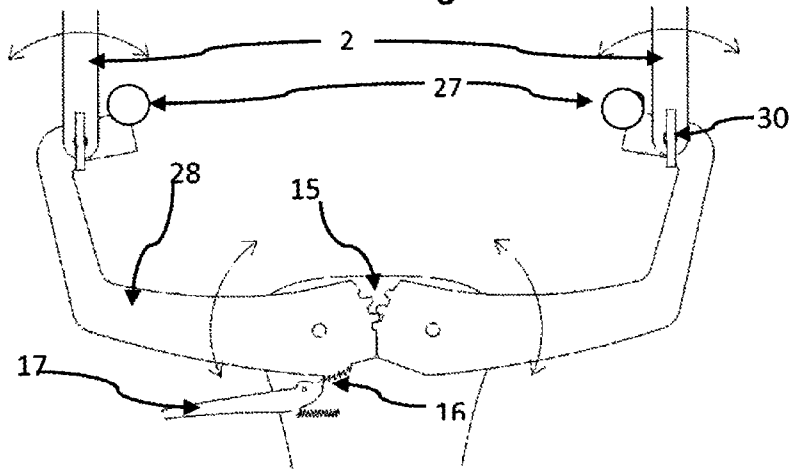


Figure-6

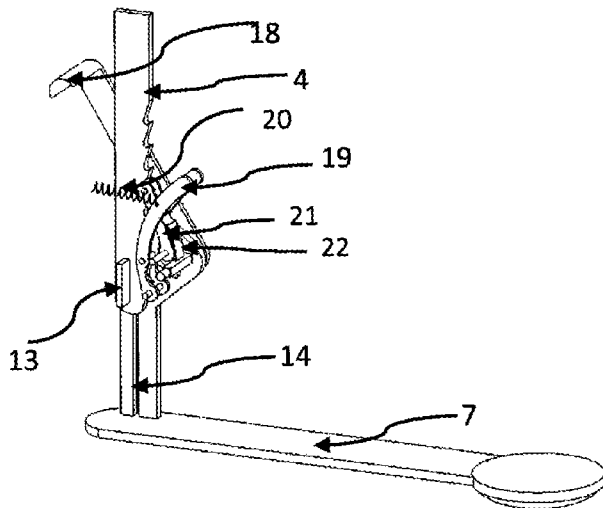


Figure-7

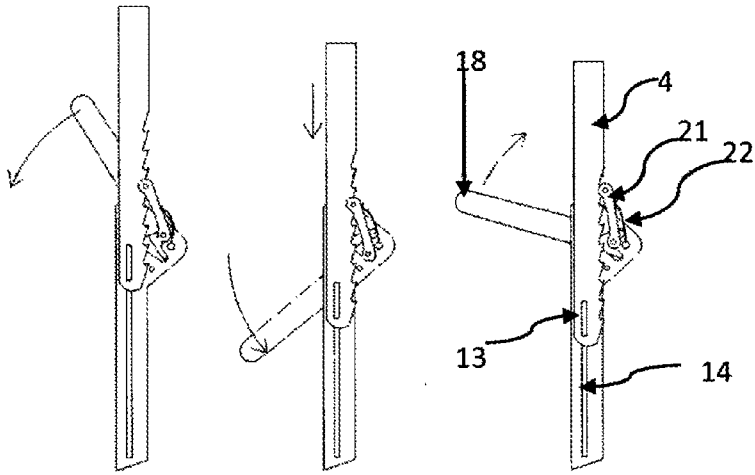


Figure-8

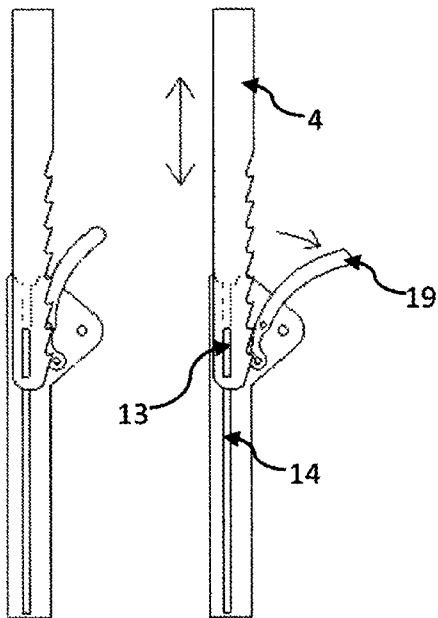


Figure-9

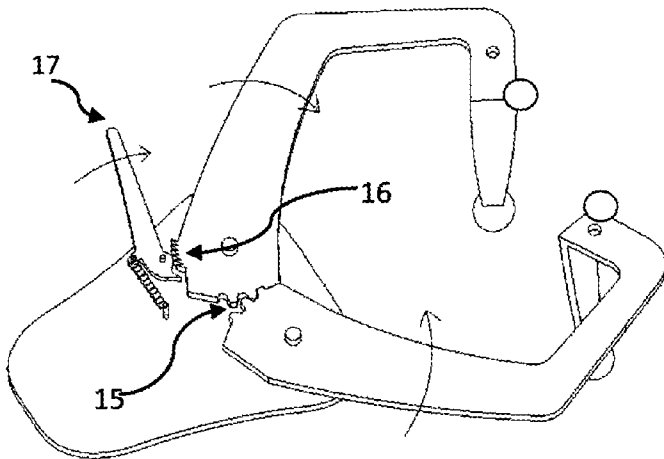


Figure-10

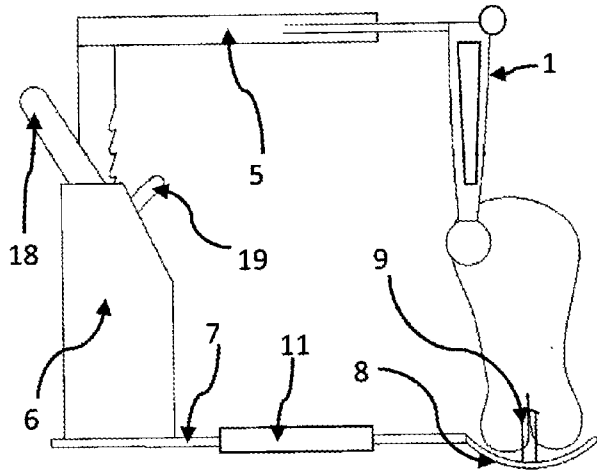


Figure-11

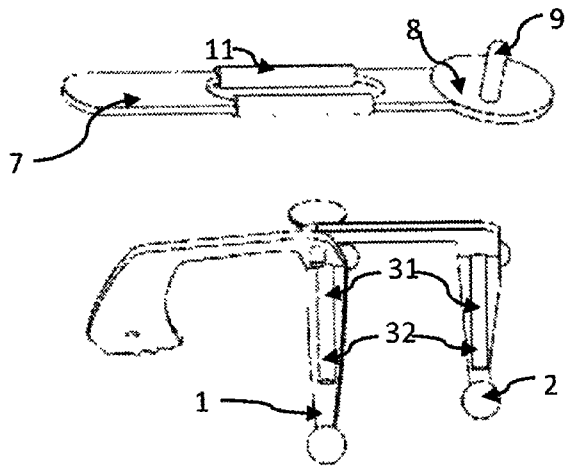


Figure-12

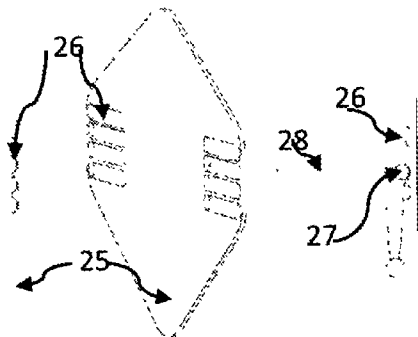


Figure-13

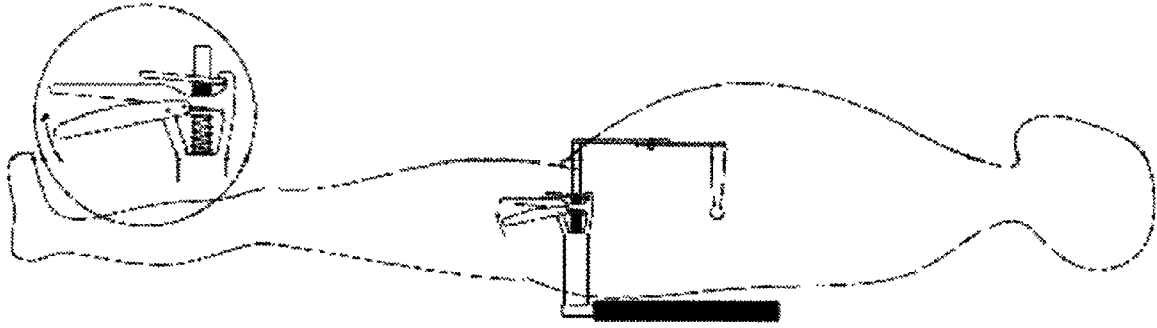


Figure-14

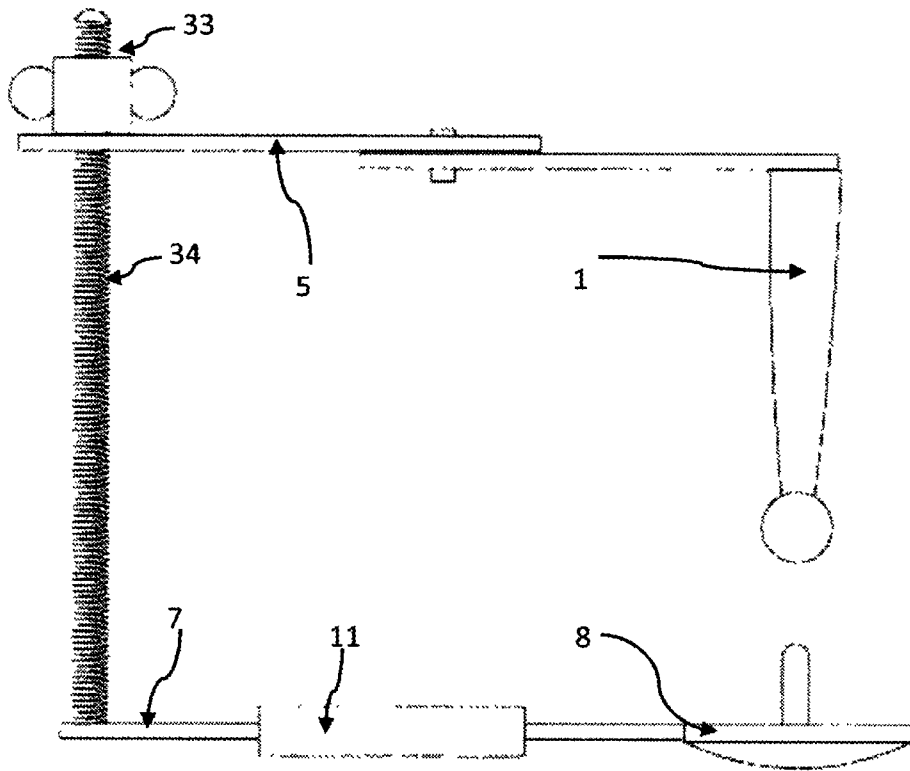


Figure-15