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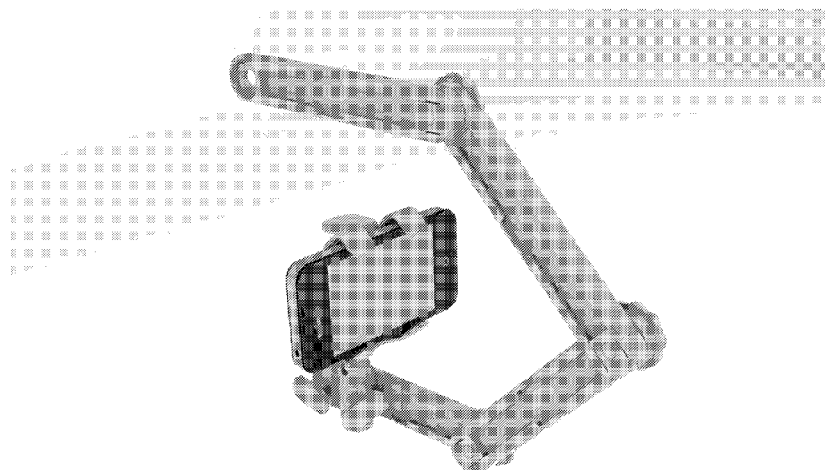
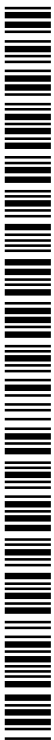


Figure 11

(57) Abstract: The present disclosure describes a device for mounting a camera and methods of using the same. The device comprises one or more mounting segments, preferably two or more mounting segments which may preferably be connected together. In preferred embodiments, the device further comprises one fastener-free mounting segment and one or more fastener-enabled mounting segments, wherein a fastener-enabled mounting segment comprises a mounting brace, a fastener, a mounting nut, and a mounting spacer, and wherein a fastener-free mounting segment comprises a mounting brace.



CAMERA MOUNTING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Patent Appl. No. 61/800,238, filed on March 15, 2013, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND

Field of the Invention

The present disclosure relates to devices for mounting a camera and methods of using the same.

Description of the Related Art

Digital cameras were first invented nearly forty years ago, and have eventually become the dominant technology in consumer photography.¹ In addition to stand-alone devices such as compact digital cameras and digital single lens reflex (DSLR) cameras, digital cameras have now become commonplace as integrated elements of portable electronic devices such as cellular phones, smart phones, and tablets. Both stand-alone digital cameras and integrated digital cameras are now capable of recording videos as well. Stand-alone cameras have a well-developed array of accessories for use therewith, such as electronic flash units, constant lighting sources, microphones and other recording devices, and tripods and other mounting devices. By

¹ http://en.wikipedia.org/wiki/digital_camera

contrast, integrated digital cameras on portable electronic devices do not have a similar array of available accessories for use therewith.

Integrated digital cameras on portable electronic devices such as cellular phones, smart phones, and tablets are useful in part because of the multi-functionality and portability of these devices. Thus, when in possession of such a device an individual does not have to have a stand-alone camera available whenever an occasion or opportunity for photography or videography arises. However, this also limits the utility of integrated digital cameras, as the user does not have access to accessories that can enhance the user's photography or videography like those available for stand-alone cameras. While the quality of photographs and videos generated using integrated digital cameras is rapidly increasing, the lack of available accessories still limits the use of such cameras to certain types of situations. The unavailability of accessories for mounting integrated digital cameras limits the use and effectiveness of such cameras in capturing many types of images and video recordings.

Thus there remains a need for a portable device that enables users to mount or otherwise secure integrated digital cameras while taking photographs and generating video recordings.

SUMMARY

The present disclosure describes a device for mounting a camera and methods of using the same. The device comprises one or more mounting segments, preferably two or more mounting segments which may preferably be connected together. In preferred embodiments, the device further comprises one fastener-free mounting segment and one or more fastener-enabled mounting segments, wherein a fastener-enabled mounting segment comprises a mounting brace, a fastener, a mounting nut, and a mounting spacer, and wherein a fastener-free mounting

segment comprises a mounting brace. In highly preferred embodiments, the mounting brace comprises two terminal holes and a mounting channel comprising a spring clamp fixation site and one or more threaded holes, the fastener comprises a threaded extension member, the spacer comprises a hole that will accommodate the threaded extension member, and the mounting nut comprises a threaded hole that will accommodate the threaded extension member and a plurality of lock points that allow for incremental adjustment of the mounting segment with respect to an adjacent mounting segment. In highly preferred embodiments, the mounting channel has about the same dimensions as a traditional camera flash shoe.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the components of a mounting segment of a preferred embodiment of the device.

Fig. 2 shows a preferred embodiment of the device with four mounting segments connected linearly.

Fig. 3 shows a folded configuration of a preferred embodiment of the device with four mounting segments.

Fig. 4 shows a spring/release embodiment of the device.

Fig. 5 shows a spring/release embodiment of the device.

Fig. 6 shows the mounting base and mounting channel of a spring/release embodiment of the device.

Fig. 7 shows the fastener, mounting nut, and mounting spacer of a spring/release embodiment of the device.

Fig. 8 shows the internal spring plate of a spring/release embodiment of the device.

Fig. 9 shows the ball head section of an accessory attachment adapter.

Fig. 10 shows an accessory attachment adapter.

Fig. 11 shows a scorpion configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 12 shows a scorpion configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 13 shows a scorpion configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 14 shows a scorpion configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 15 shows a pole configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 16 shows a pole configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 17 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 18 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and accessories.

Fig. 19 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and accessories.

Fig. 20 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and accessories.

Fig. 21 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 22 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 23 shows a C configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 24 shows a shoulder mounting configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 25 shows a shoulder mounting configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 26 shows a shoulder mounting configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 27 shows a tripod mounting configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 28 shows a tripod mounting configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 29 shows a scorpion configuration of a preferred embodiment of the device securing a stand-alone digital camera.

Fig. 30 shows a scorpion configuration of a preferred embodiment of the device securing a stand-alone DSLR camera.

Fig. 31 shows an L configuration of a preferred embodiment of the device securing a smart phone integrated digital camera.

Fig. 32 shows an L configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 33 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 34 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 35 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 36 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 37 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 38 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 39 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 40 shows a closed quick draw configuration of the device securing a smart phone integrated digital camera.

Fig. 41 shows a scorpion configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 42 shows a scorpion configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 43 shows a scorpion configuration of a preferred embodiment of the device securing a stand-alone digital camera and an accessory.

Fig. 44 shows a Z configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 45 shows a Z configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 46 shows a Z configuration of a preferred embodiment of the device securing a smart phone integrated digital camera and an accessory.

Fig. 47 shows an exemplary fastener-enabled mounting segment and its components.

Fig. 48 shows an exemplary ball joint mount and its components.

Fig. 49 shows an exemplary spring clamp and its components.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present disclosure describes a device for mounting a camera and methods of using the same. The device comprises one or more mounting segments, preferably two or more mounting segments wherein each mounting segment is connected to one or two other mounting segments.

In preferred embodiments, each mounting segment may be connected to one or two other mounting segments using a fastener, wherein a mounting segment may be a fastener-enabled mounting segment or a fastener-free mounting segment. In preferred embodiments, the device comprises one fastener-free mounting segment and one or more fastener-enabled mounting segments. In preferred embodiments, a fastener-enabled mounting segment (1) comprises a mounting brace (2), a fastener (3), a mounting nut (4), and a mounting spacer (5), and a fastener-

free mounting segment (6) comprises a mounting brace (2). In more preferred embodiments, the mounting brace comprises a mounting channel (7) and two terminal holes (8). In highly preferred embodiments, the mounting channel may comprise a spring clamp fixation site (9). A preferred embodiment of a fastener-enabled mounting segment is shown in Figure 1.

In some preferred embodiments, the device may comprise four mounting segments, wherein one mounting segment is a fastener-free mounting segment and three mounting segments are fastener-enabled mounting segments. Additional fastener-enabled mounting segments may be added to or removed from the device to enhance its functionality. In more preferred embodiments, the mounting segments may be fastened together linearly, wherein one mounting segment on each end of the device is fastened to one other mounting segment and all other mounting segments are fastened to two other mounting segments. An embodiment of this configuration is shown in Figure 2.

In preferred embodiments, the fastener (3) may comprise a threaded extension member (10). In more preferred embodiments, the spacer (5) may comprise a hole (11) that will accommodate the threaded extension member, and the mounting nut (4) may comprise a threaded hole that will accommodate the threaded extension member. In highly preferred embodiments, the mounting nut (4) may comprise a hole (12) and a plurality of lock points (13). The lock points may allow for incremental adjustment of the mounting segment with respect to an adjacent mounting segment. Two mounting segments may be configured in the desired relative alignment and the mounting nut (4) may then be secured to the fastener (3) through a terminal hole (8) in each mounting segment to lock two mounting segments into the desired relative positions. Any other suitable locking mechanism may be used to secure the mounting

nut (4) to the fastener (3) and thereby lock the mounting segments together. The steps described above may be repeated to lock all mounting segments into the desired relative positions.

In some preferred embodiments, the mounting channel may comprise one or more threaded holes (14). In more preferred embodiments, the threaded holes may comprise 1/4-20 or 3/8-16 threaded holes, as found on many tripods.

The device may be configured to generate fully overlapping mounting segments, resembling a carpenter's ruler, as shown in Figure 3. In this configuration, the device may be highly portable and may preferably fit readily into a pocket on the user's clothing.

In some non-preferred embodiments, the mounting segments may be connected using a spring and a pressure-activated release button to allow for movement of each mounting segment relative to the other mounting segment(s) to which it is connected, as shown in Figures 4-8. When pressure is applied to the release button the spring disengages, allowing the mounting segments to move freely with respect to one another. When pressure is subsequently removed from the release button the spring reengages and the mounting segments are then locked securely into their current positions.

In other non-preferred embodiments, the mounting segments may be connected via dual pivot points in a manner analogous to a foldable ladder.

In preferred embodiments, a camera or video accessory may be mounted to the device via the mounting channel (7). The mounting channel may preferably have the same dimensions as a traditional camera flash shoe, as defined by the International Organization for Standardization in ISO 518:2006.² Any camera or video accessory designed to interface with a device using a traditional camera flash shoe may thereby be connected to the device via the mounting channel.

² http://www.iso.org/iso/catalogue_detail.htm?csnumber=36330

In other preferred embodiments, a camera, camera accessory, videocamera, or video accessory may be mounted to the device using an adapter that is configured to attach to the device via the mounting channel (7) and is configured to attach to the camera, camera accessory, videocamera, or video accessory via a ¼-20 threaded tripod mount. The adapter may preferably comprise a ball head (15) to allow for adjustment of the position of the camera, camera accessory, videocamera, or video accessory, as shown in Figure 9. A preferred embodiment of the adapter is shown in Figure 10.

In preferred embodiments, the device may allow a user to hold, maneuver, and stabilize a camera, videocamera, camera accessory, or videocamera accessory in a variety of different ways. A camera may be a stand-alone camera such as a compact digital camera or a DSLR camera or an integrated digital camera such as a digital camera that is an element of a portable electronic device such as a cellular phone, smart phone, or tablet. A videocamera may be a stand-alone videocamera or an integrated videocamera such as a videocamera that is an element of a portable electronic device such as a cellular phone, smart phone, or tablet.

An integrated camera or integrated videocamera that is an element of a portable electronic device such as a cellular phone, smart phone, or tablet may be attached to the device using a spring clamp and ball joint mount. The spring clamp may be attached to the mounting channel at the spring clamp fixation site via the ball joint mount and configured to secure the portable electronic device. The spring clamp will secure the portable electronic device by applying sufficient pressure to the outside edges of the portable electronic device via compression of the spring to cradle and secure the portable electronic device. Preferred embodiments illustrating use of the spring clamp and ball joint mount are shown in Figures 11-14.

The device may preferably allow a user to generate a variety of different configurations that can be useful when photographing or filming a subject. In some embodiments, the device may be configured linearly to replicate a mono pod/pole or extension arm, as shown in Figures 15-16. This allows a user to extend the reach of a camera or videocamera for outcomes such as increasing the height of or changing the angle of the camera or videocamera while in use. In other embodiments, the device may be configured to generate a 90 degree angle that allows for two-handed operation, as shown in Figures 17-23. In other embodiments, the device may be configured such that the user may brace the device against the user's arm and chest such that the device serves as a shoulder support, as shown in Figures 24-26. In other embodiments, the device may be mounted to a tripod for hands-free photography or videography, as shown in Figures 27-28. In other embodiments, the device may be mounting to an object or surface such as a desk or wall using a clamp and a base plate, enabling the user to use the device in applications such as hands-free videoconferencing. In other embodiments, the device may be used as a hands-free body mount, enabling the user to photograph himself/herself or a subject. In other embodiments, the device may be mounted to a smooth surface via a suction cup.

In preferred embodiments, a camera, camera accessory, videocamera, or video accessory may be mounted to the device anywhere along the mounting channel, thereby greatly increasing customizability.

The device significantly enhances a user's ability to use a portable electronic device such as a cellular phone, smart phone, or tablet as a camera or videocamera. The device allows the user to generate a variety of configurations using a single highly portable mounting device. In addition to its use with portable electronic devices, the device also allows similar customizable

configuration of stand-alone cameras and videocameras, thereby providing a user with additional functionality without requiring a separate device to achieve such functionality.

Examples

An example of the fastener-enabled mounting segment is shown in Figure 47. Figure 47 shows an exemplary fastener-enabled mounting segment comprising a mounting brace (2) 1005-099 with nominal dimensions A approximately 0.77", B approximately 0.52", C approximately 0.10", D approximately 5.00", E approximately 0.48", and F approximately 0.98"; a mounting nut (4) 1005-098 with nominal dimensions A approximately 0.82", B approximately 0.36", and C approximately 0.31"; a mounting spacer (5) 1005-097 with nominal dimensions A approximately 0.17", B approximately 0.24", and C approximately 0.49"; and a fastener (3) 1005-096 with nominal dimensions A approximately 0.13", B approximately 0.75", and C approximately 0.63".

An example of the ball joint mount is shown in Figure 48. Figure 48 shows an exemplary ball joint mount comprising a main pivot body 1006-099 with nominal dimensions A approximately 0.51", B approximately 1.49", C approximately 0.25", D approximately 0.27", and E approximately 0.57"; a clamp T block 1006-098 with nominal dimensions A approximately 0.50", B approximately 0.28", C approximately 0.07", and D approximately 0.73"; a ball joint stud 1006-097 with nominal dimensions A approximately 0.25", B approximately 0.56", and C approximately 0.40"; a ball joint fastener 1006-096 with nominal dimensions A approximately 0.63" and B approximately 0.35"; and a ball joint nut 1006-095 with nominal dimensions A approximately 0.50" and B approximately 0.14".

An example of the spring clamp is shown in Figure 49. Figure 49 shows an exemplary spring clamp comprising a main clamp 1015-099 with nominal dimensions A approximately 3.83", B approximately 2.0", C approximately 1.64", and D approximately 1.30"; a bottom clamp 1015-098 with nominal dimensions A approximately 2.13", B approximately 3.08", and C approximately 1.75"; a retainer 1015-097 with nominal dimensions A approximately 0.60", B approximately 0.10", C approximately 1.68", and D approximately 0.10"; and a spring guide 1015-096 with nominal dimensions A approximately 2.15" and B approximately 0.24".

The disclosure and examples above are intended to be illustrative and are not intended to limit or otherwise restrict the invention. Numerous variations and modifications will become apparent to those skilled in the art upon full appreciation of the above disclosure.

For example, one skilled in the art will understand that the components and parts of the camera mounting device may be modified by scaling up or scaling down the dimensions of the device without altering the dimensional ratios of these components and parts, and will also understand that the dimensional ratios of the components and parts of the camera mounting device may be altered significantly without affecting its functionality. Examples of such scaling or altering of the dimensional ratios include scaling the device up or down in size by a factor of five or ten, or altering the ratio of the components of the device such as using a larger or smaller fastener compared to the mounting segment, respectively.

It is intended that the following claims be interpreted to embrace all such variations and modifications.

All references cited herein are expressly incorporated by reference.

What is claimed is:

1. A device for mounting a camera comprising one or more mounting segments.
2. The device of claim 1 wherein the device comprises two or more mounting segments.
3. The device of claim 2 wherein the mounting segments may be connected together.
4. The device of claim 3 wherein the device further comprises one fastener-free mounting segment and one or more fastener-enabled mounting segments.
5. The device of claim 4 wherein a fastener-enabled mounting segment comprises a mounting brace, a fastener, a mounting nut, and a mounting spacer, and wherein a fastener-free mounting segment comprises a mounting brace.
6. The device of claim 5 wherein the mounting brace comprises a mounting channel and two terminal holes.
7. The device of claim 6 wherein the mounting channel further comprises a spring clamp fixation site.
8. The device of claim 7 wherein the device comprises four mounting segments.
9. The device of claim 6 wherein the fastener comprises a threaded extension member.
10. The device of claim 9 wherein the spacer comprises a hole that will accommodate the threaded extension member and the mounting nut comprises a threaded hole that will accommodate the threaded extension member.
11. The device of claim 10 wherein the mounting nut further comprises a plurality of lock points.

12. The device of claim 11 wherein the lock points allow for incremental adjustment of the mounting segment with respect to an adjacent mounting segment.

13. The device of claim 6 wherein the mounting channel comprises one or more threaded holes.

14. The device of claim 13 wherein the threaded holes comprise $\frac{1}{4}$ -20 or $\frac{3}{8}$ -16 threaded holes.

15. The device of claim 6 wherein the mounting channel has about the same dimensions as a traditional camera flash shoe.

16. The device of claim 1 wherein the device further comprises a spring clamp fixation site and a spring clamp is attached to the device via a ball joint mount.

17. The device of claim 7 wherein a spring clamp is attached to the device via a ball joint mount.

18. The device of claim 15 wherein a spring clamp is attached to the device via a ball joint mount.

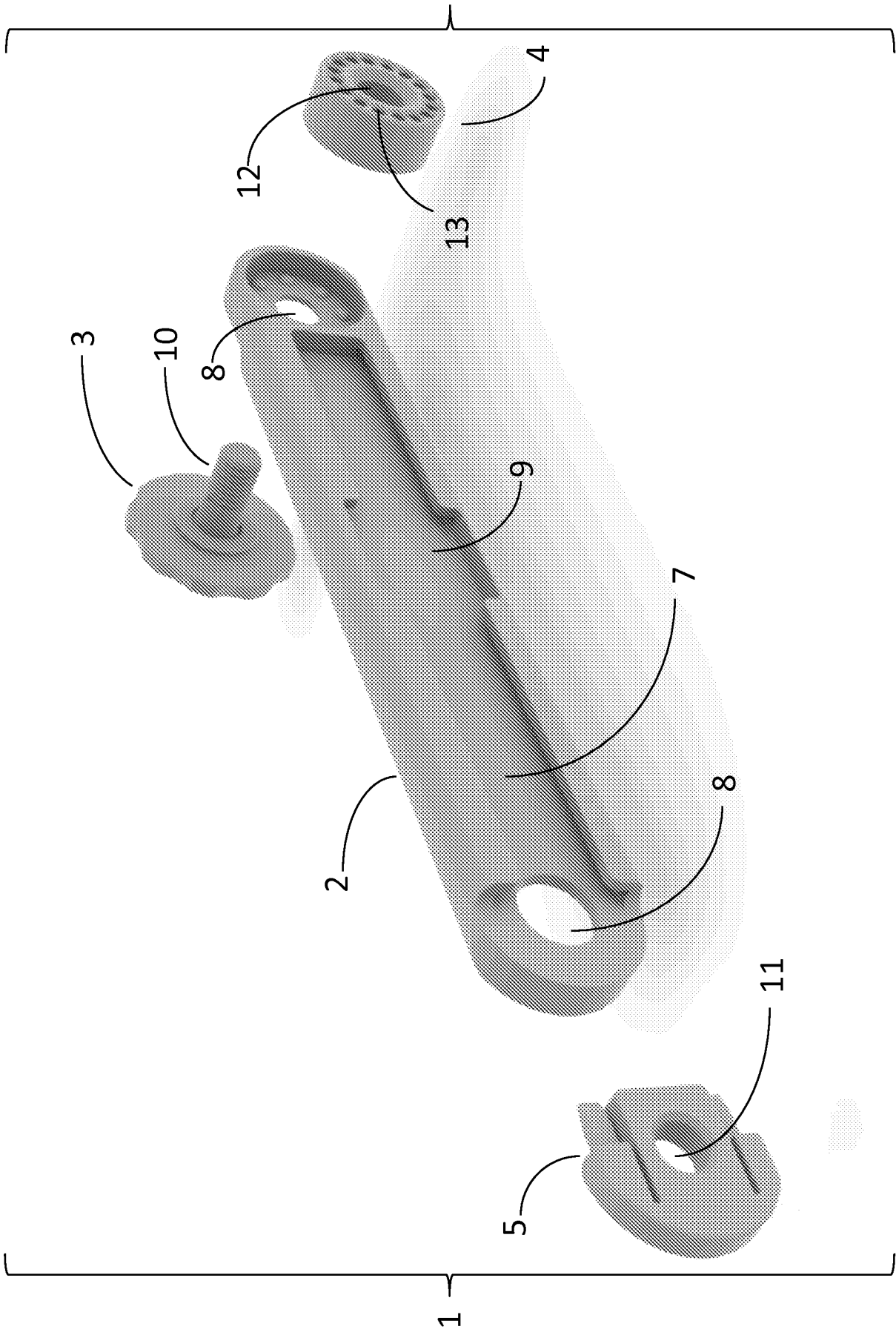


Figure 1

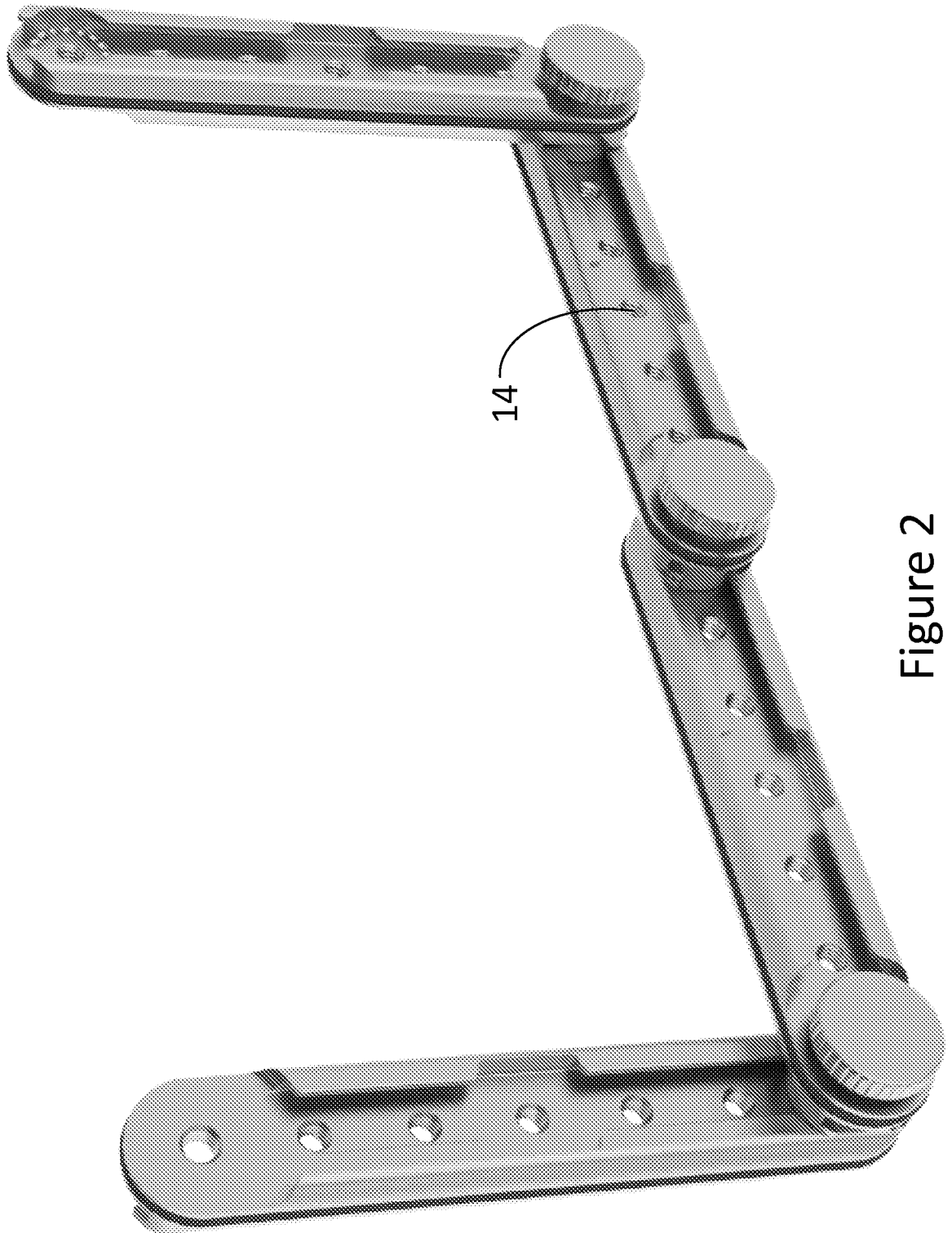


Figure 2

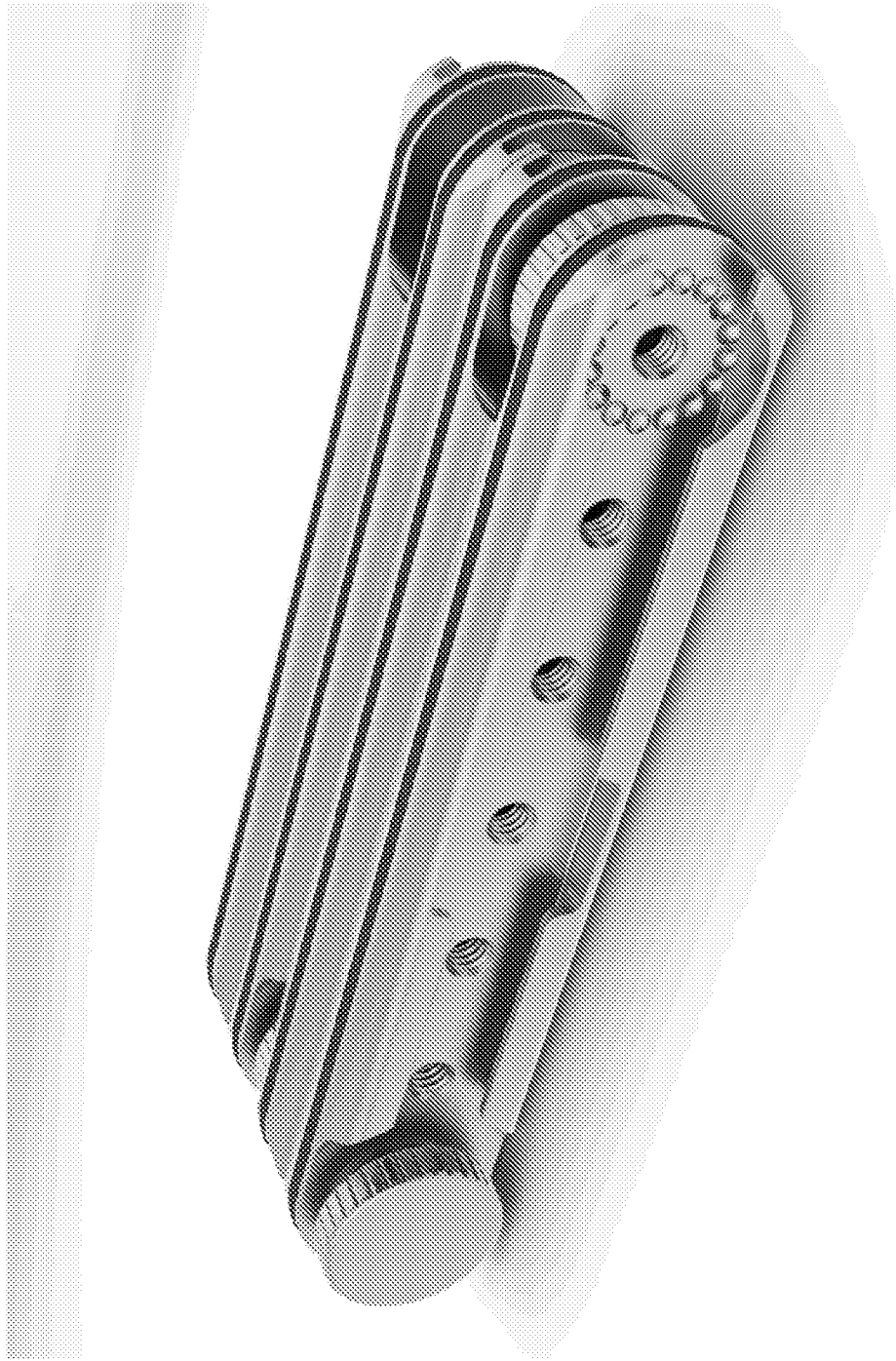


Figure 3

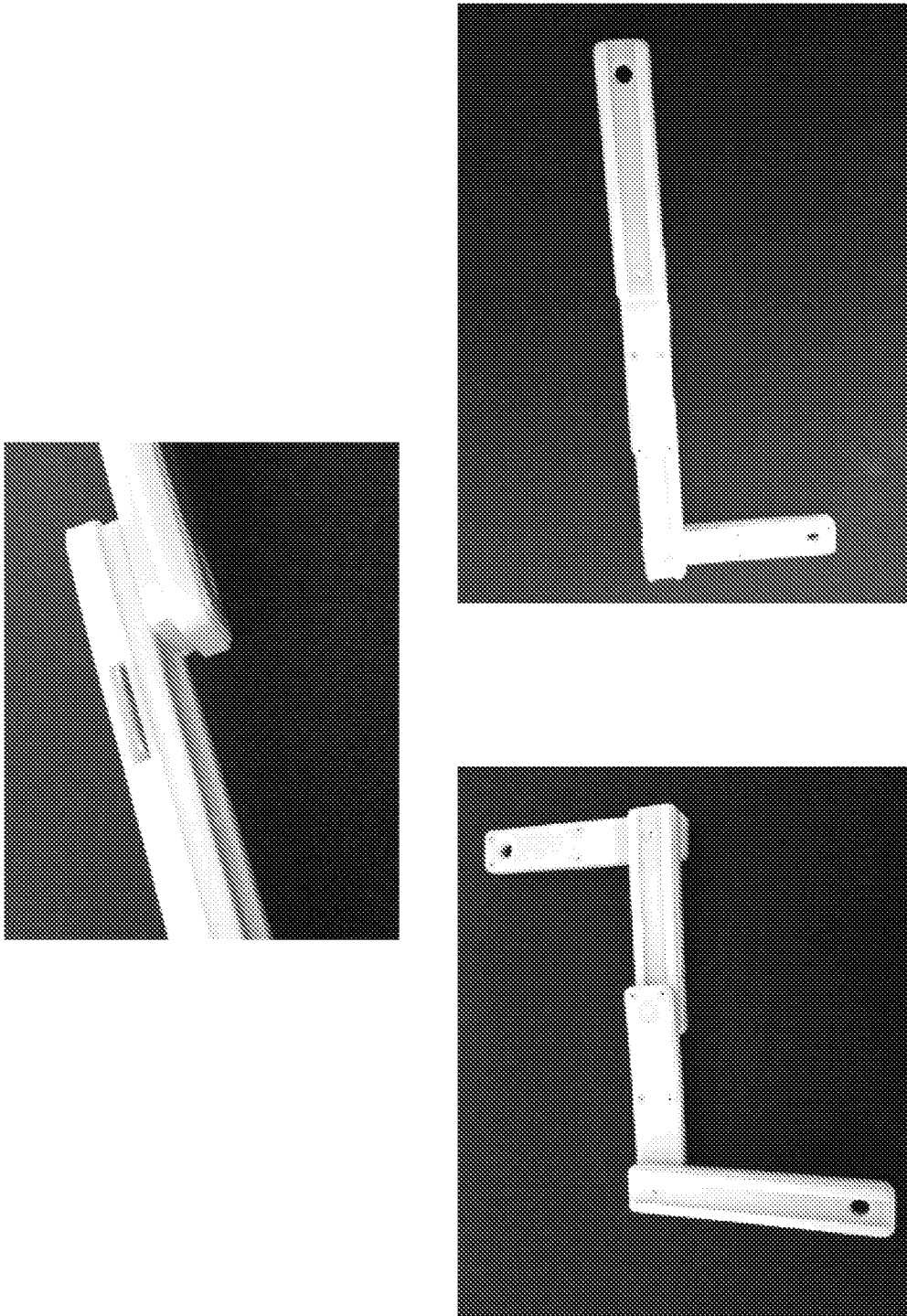


Figure 4

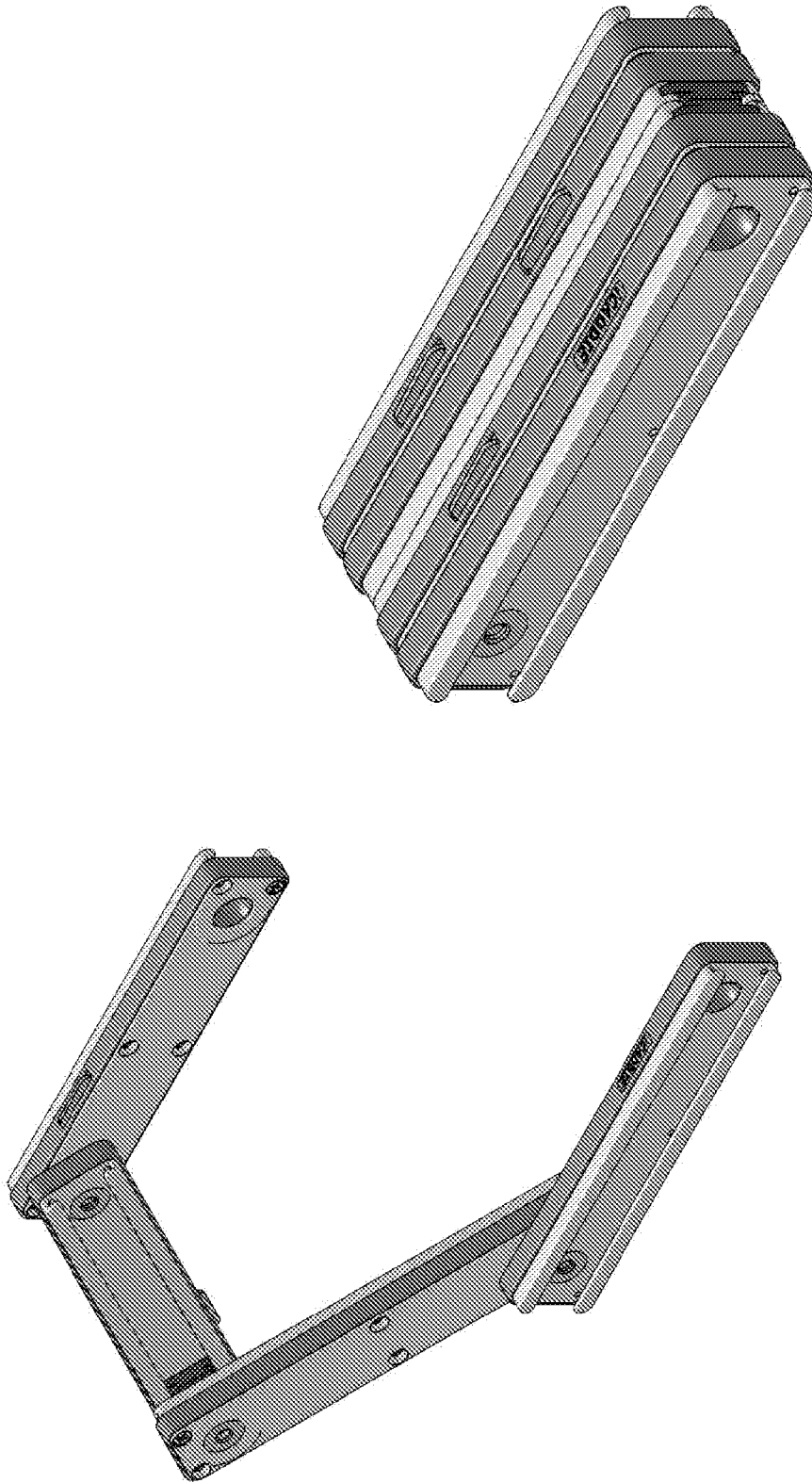


Figure 5

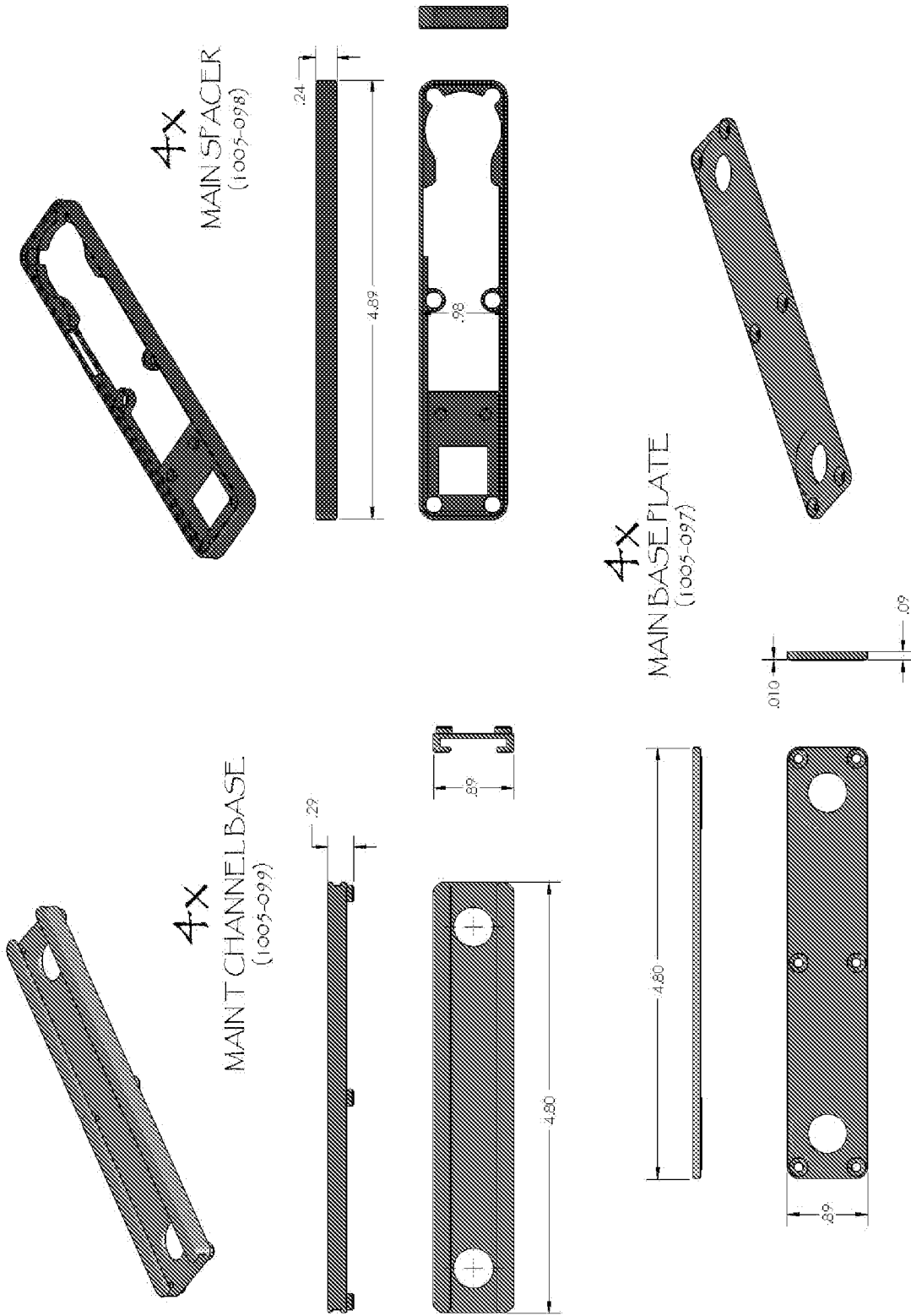


Figure 6

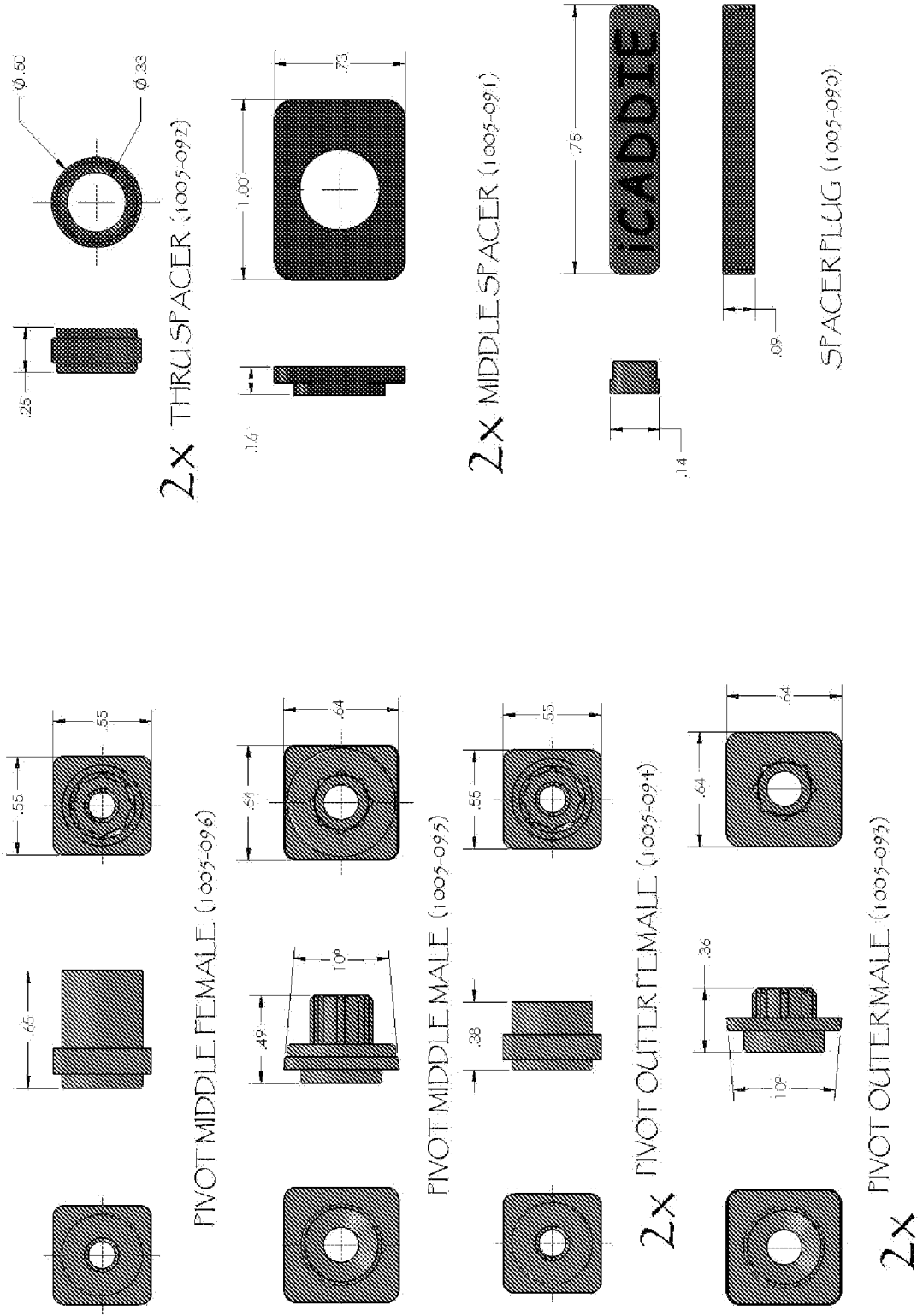


Figure 7

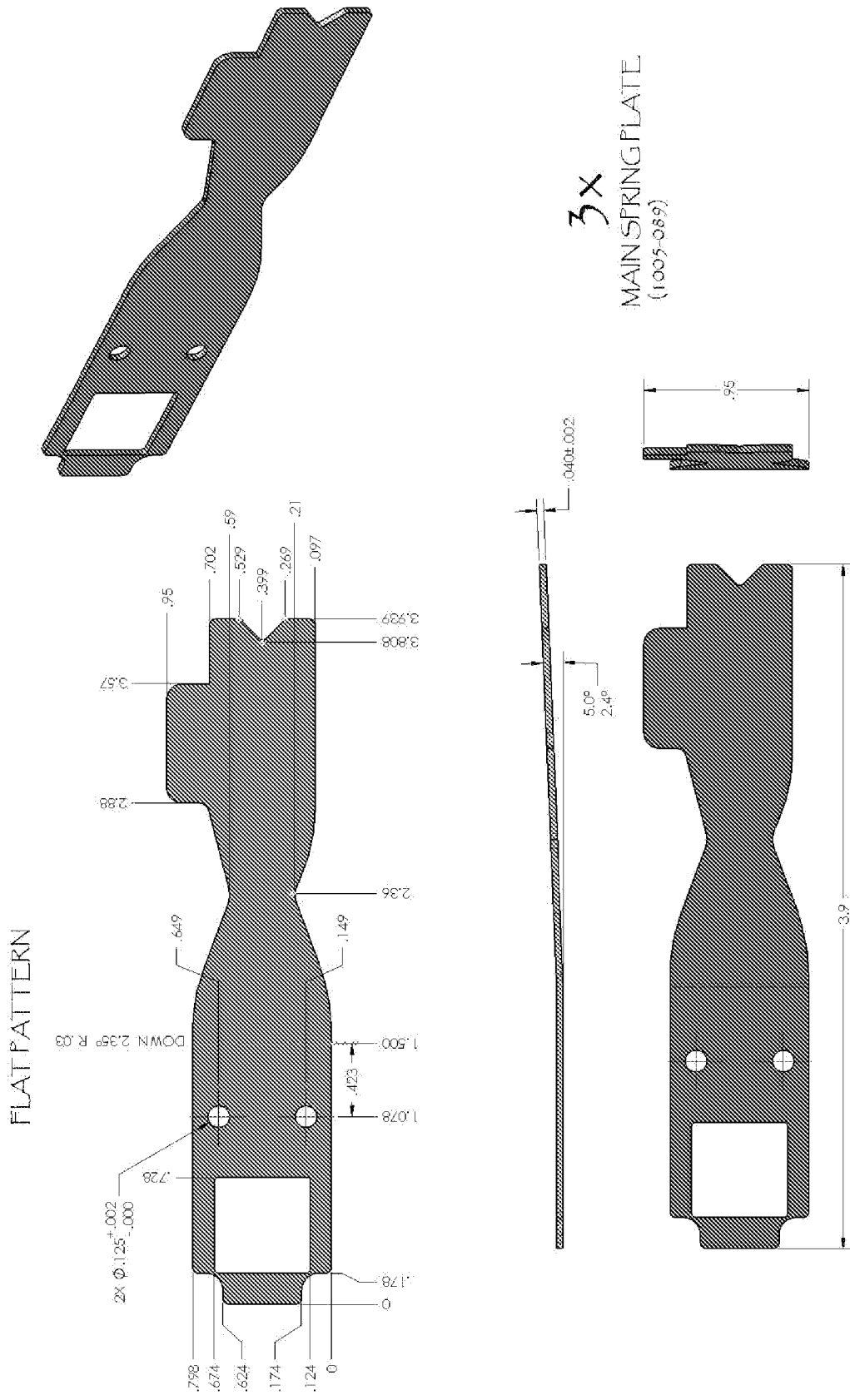


Figure 8

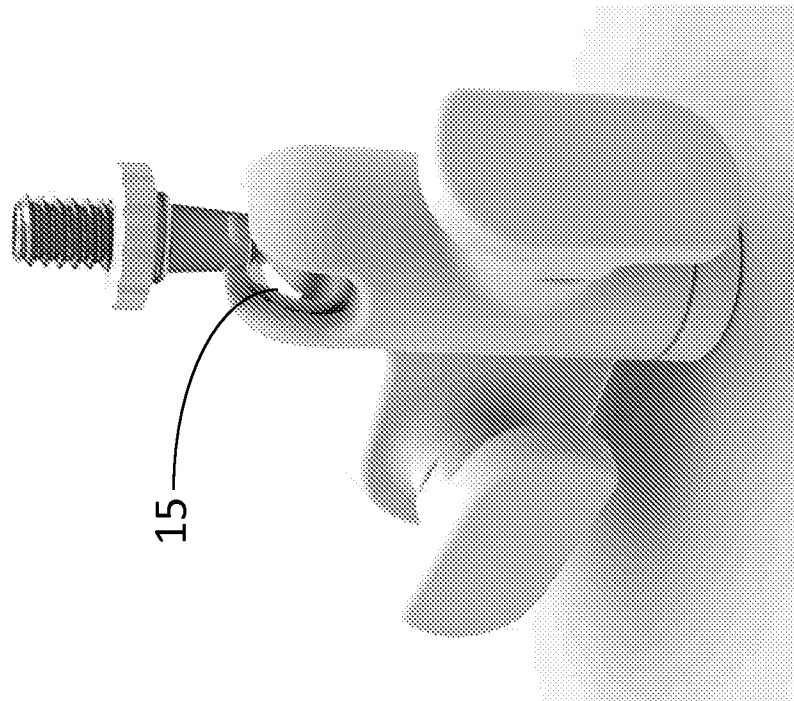


Figure 9

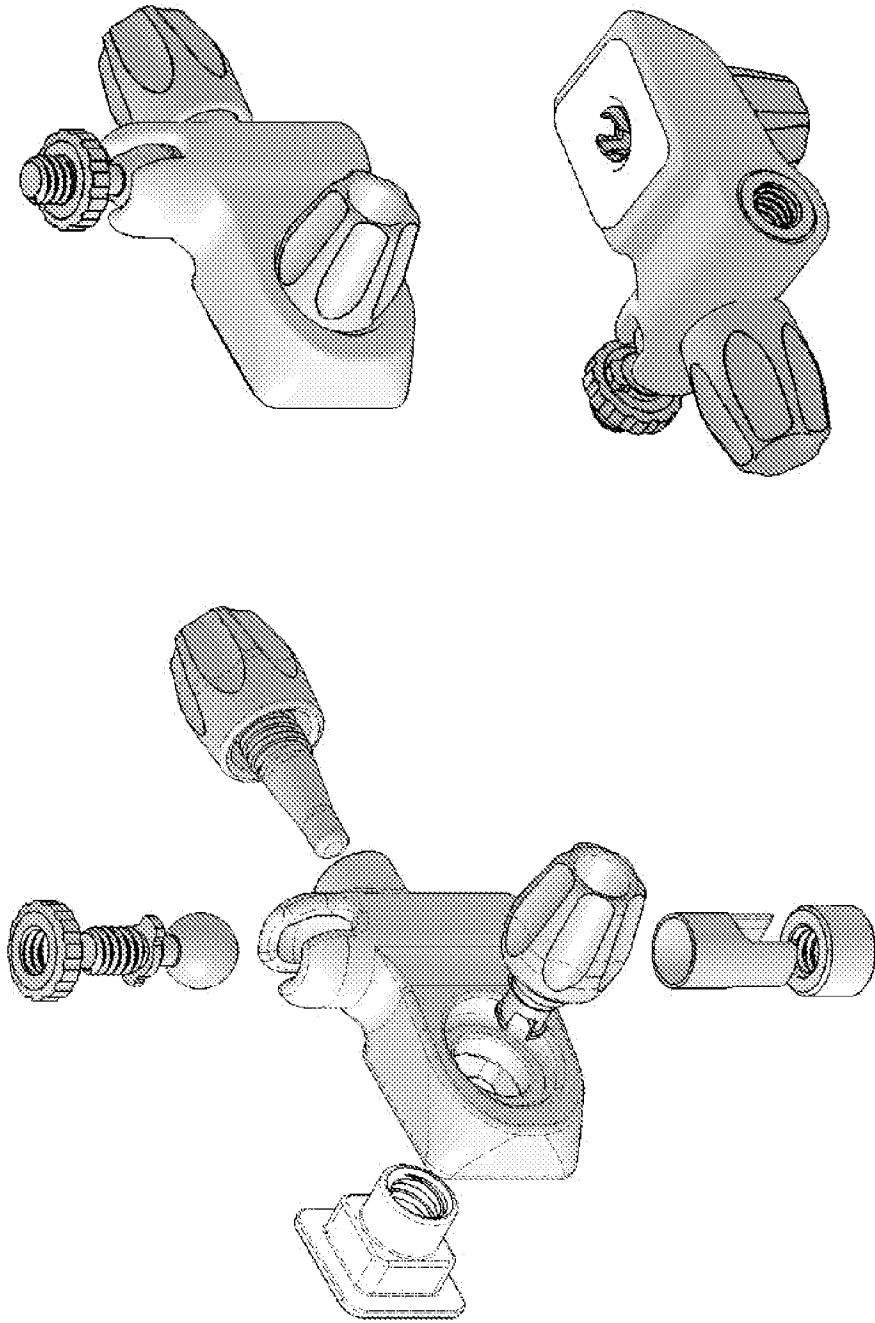


Figure 10

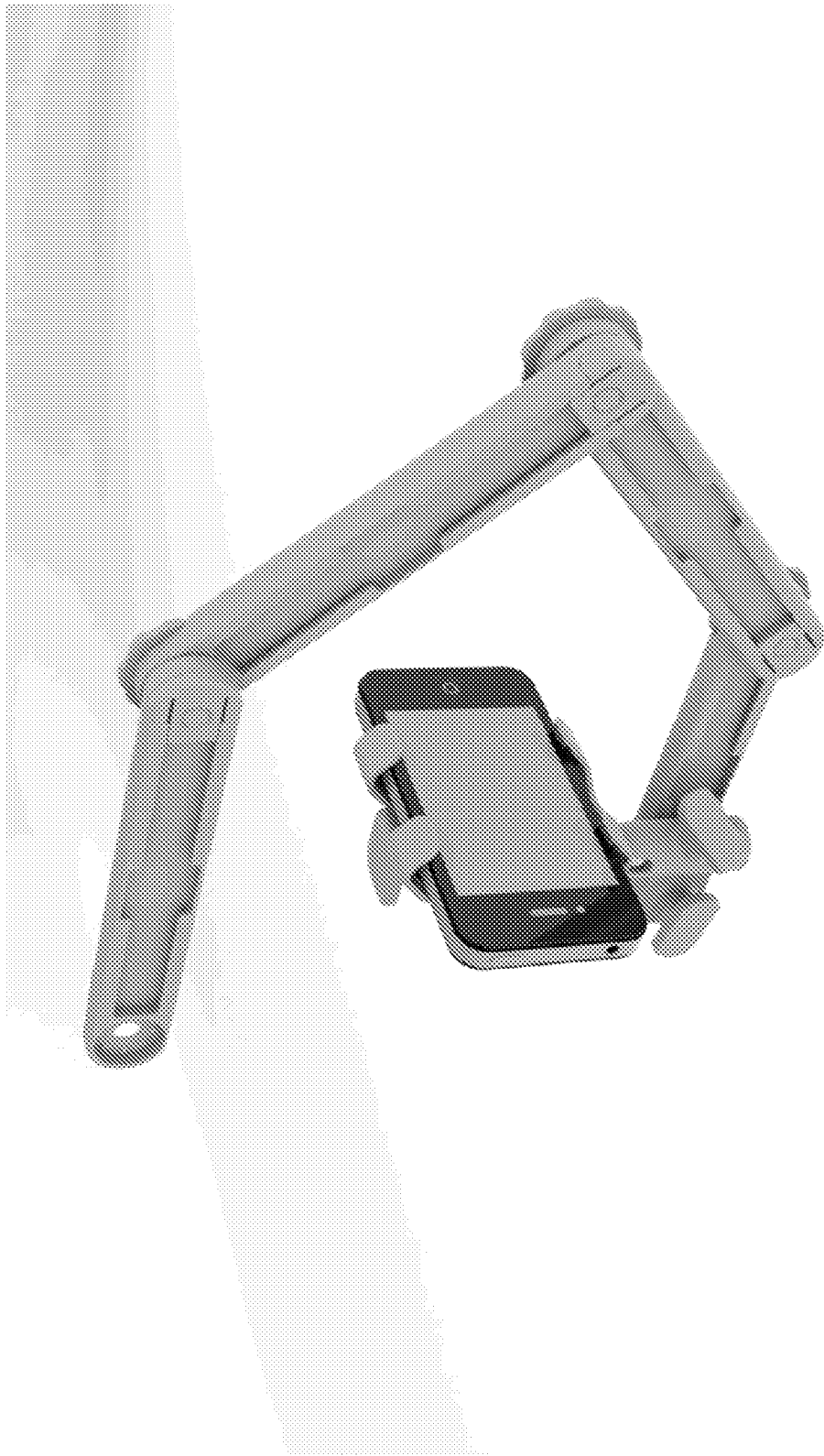


Figure 11



Figure 12

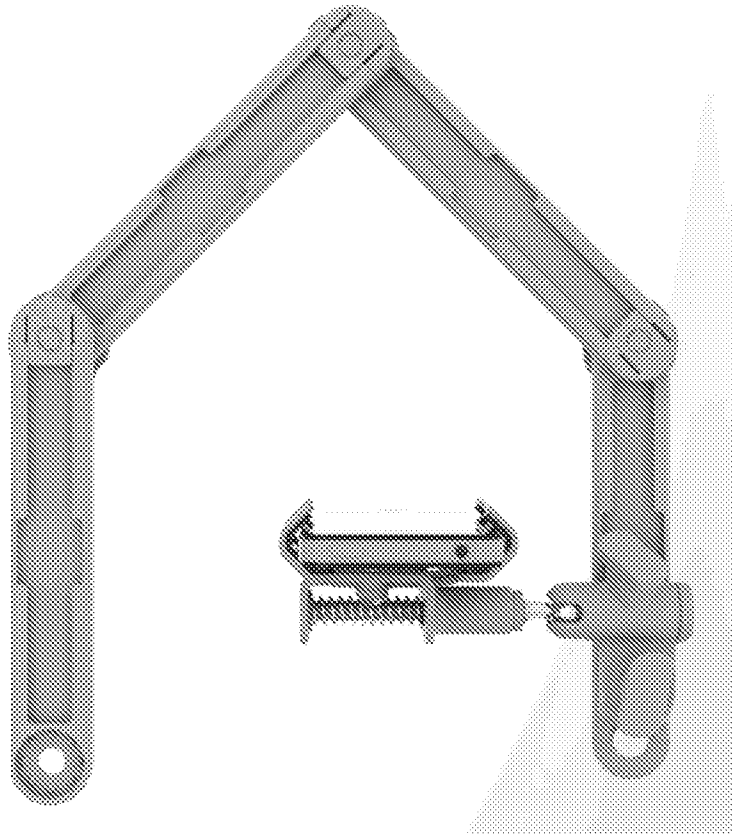
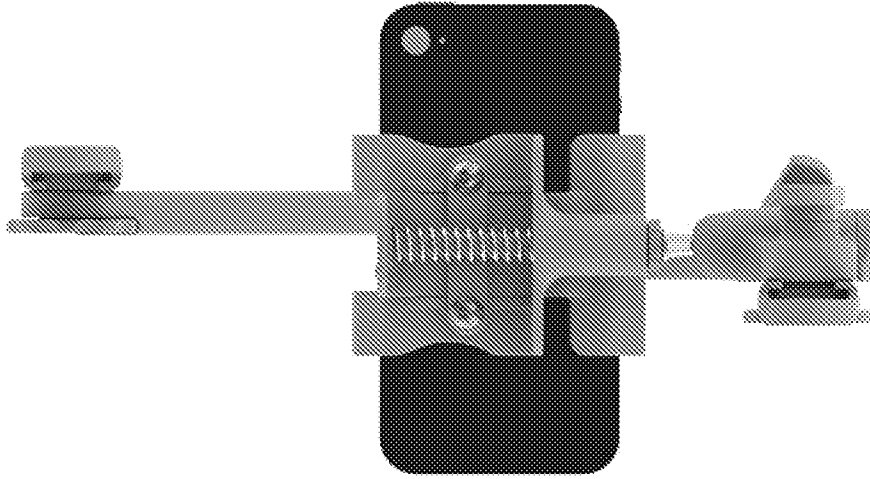


Figure 13

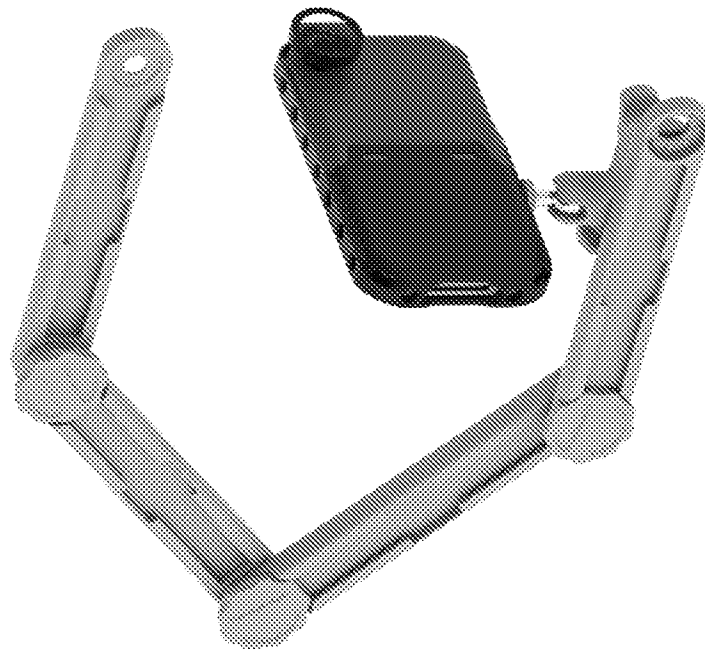


Figure 14

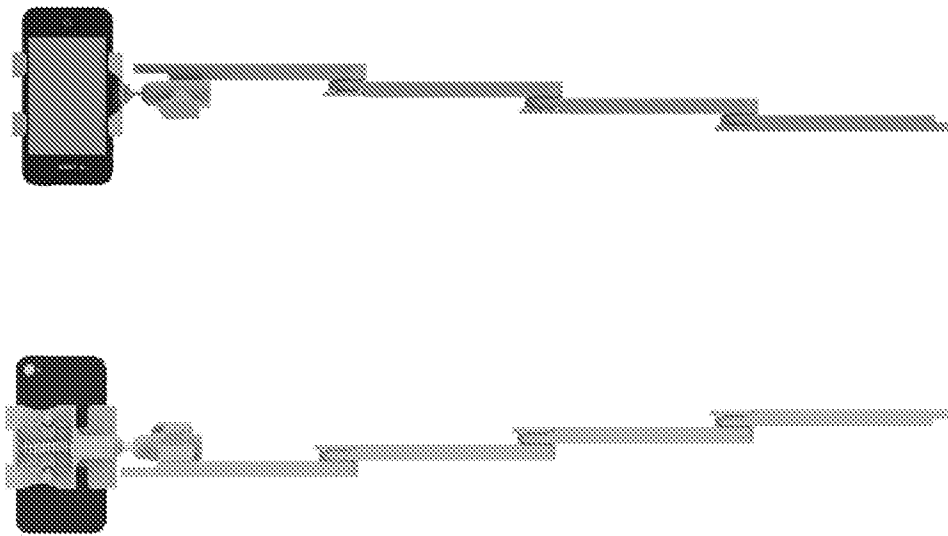


Figure 15



Figure 16



Figure 17

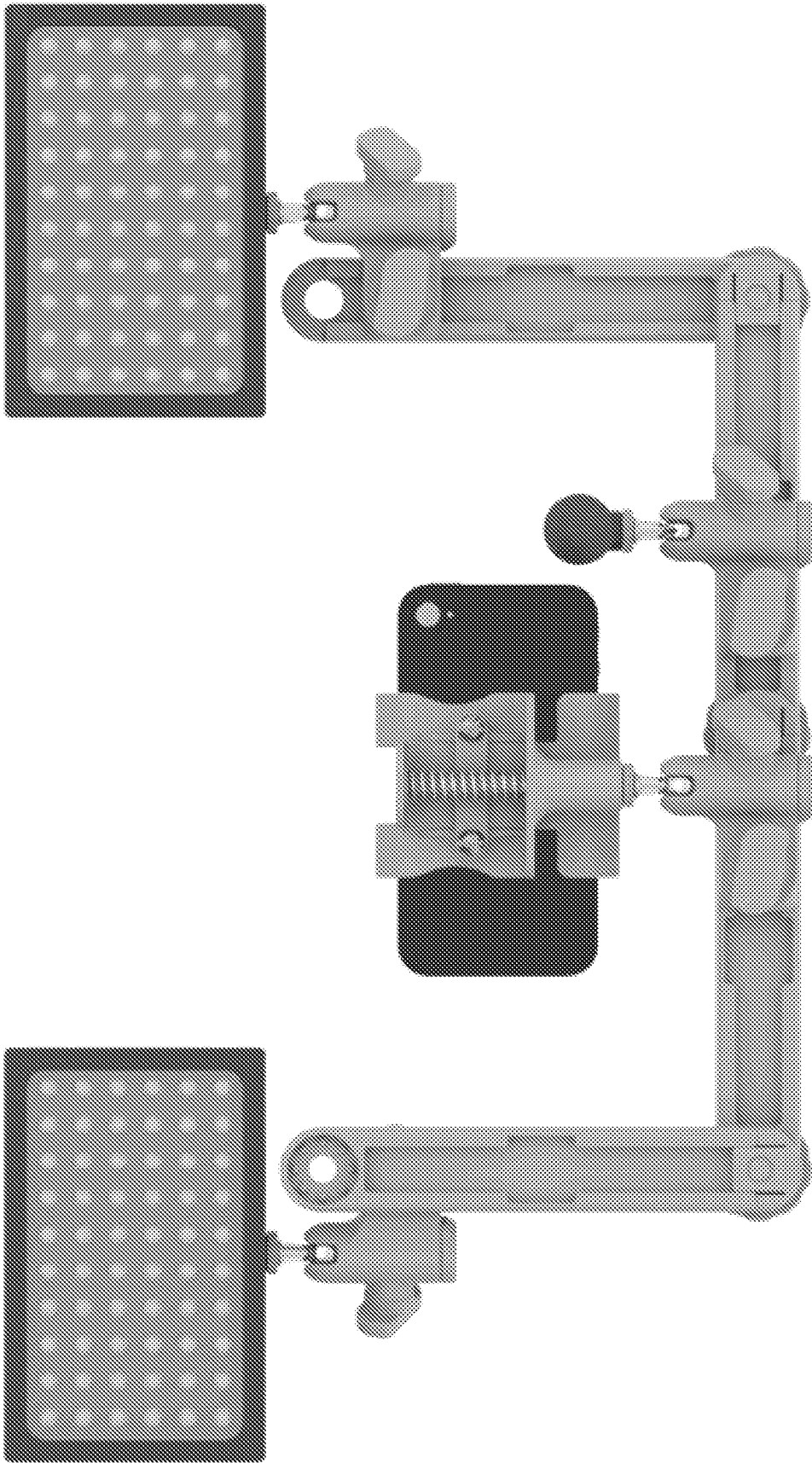


Figure 18

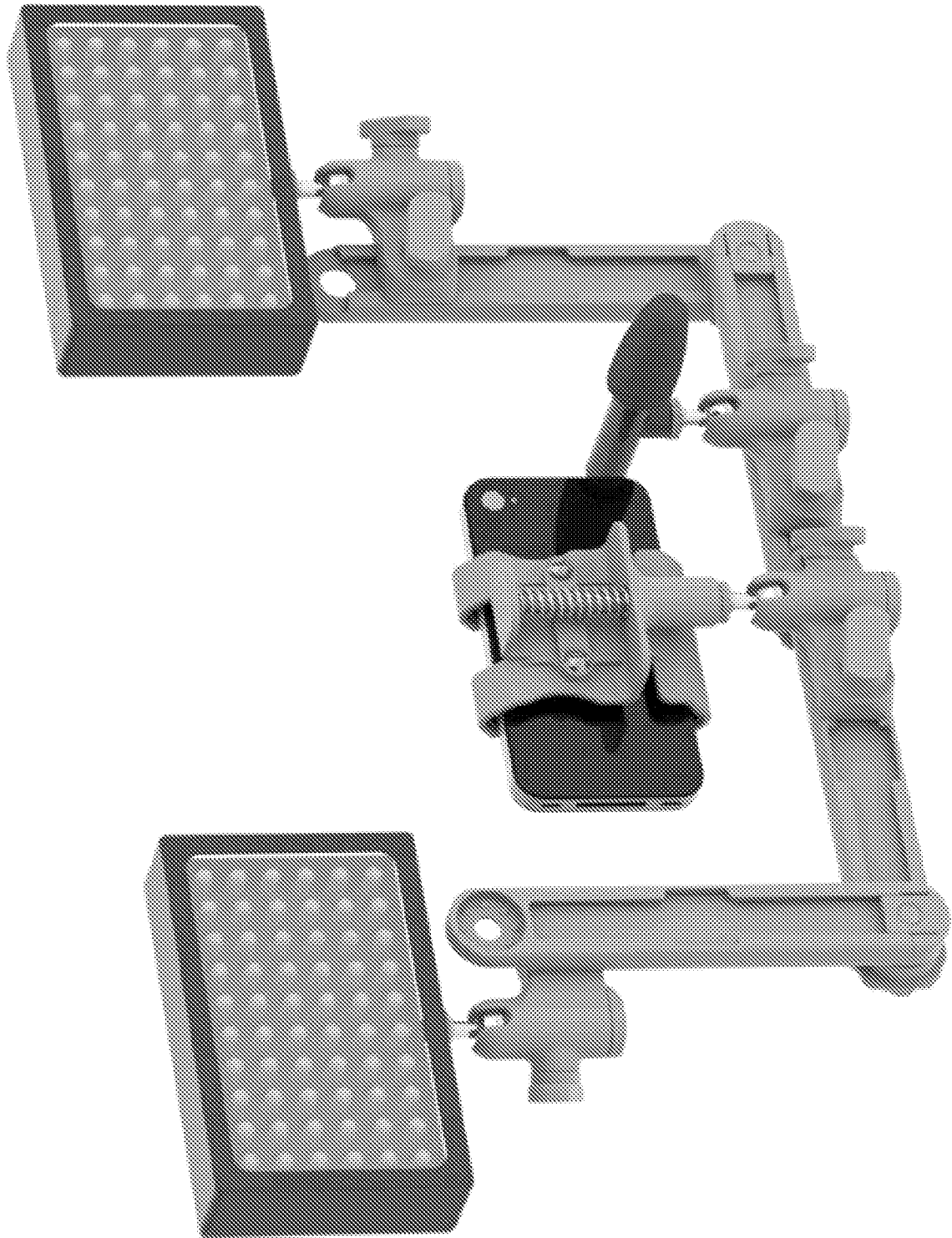


Figure 19

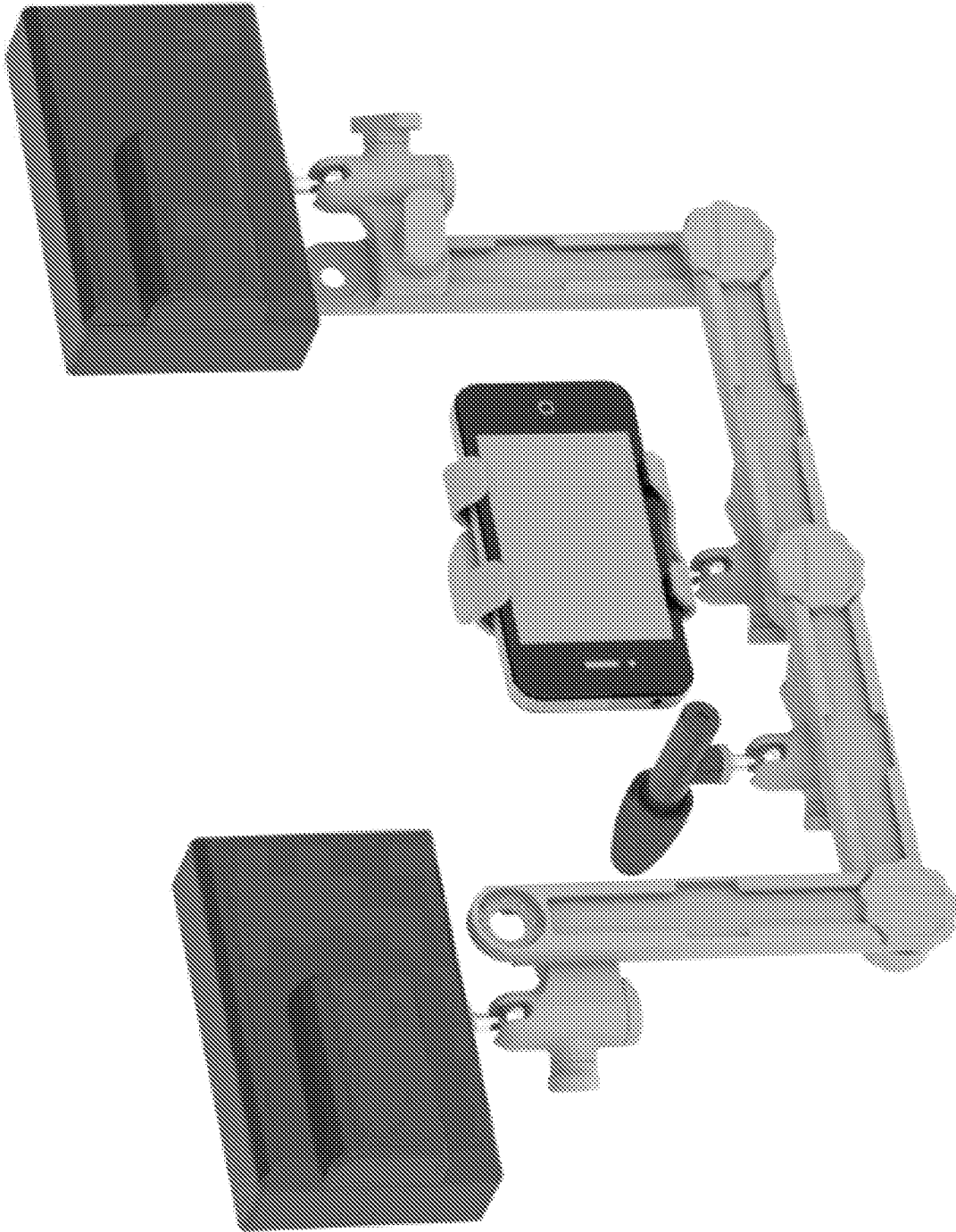


Figure 20

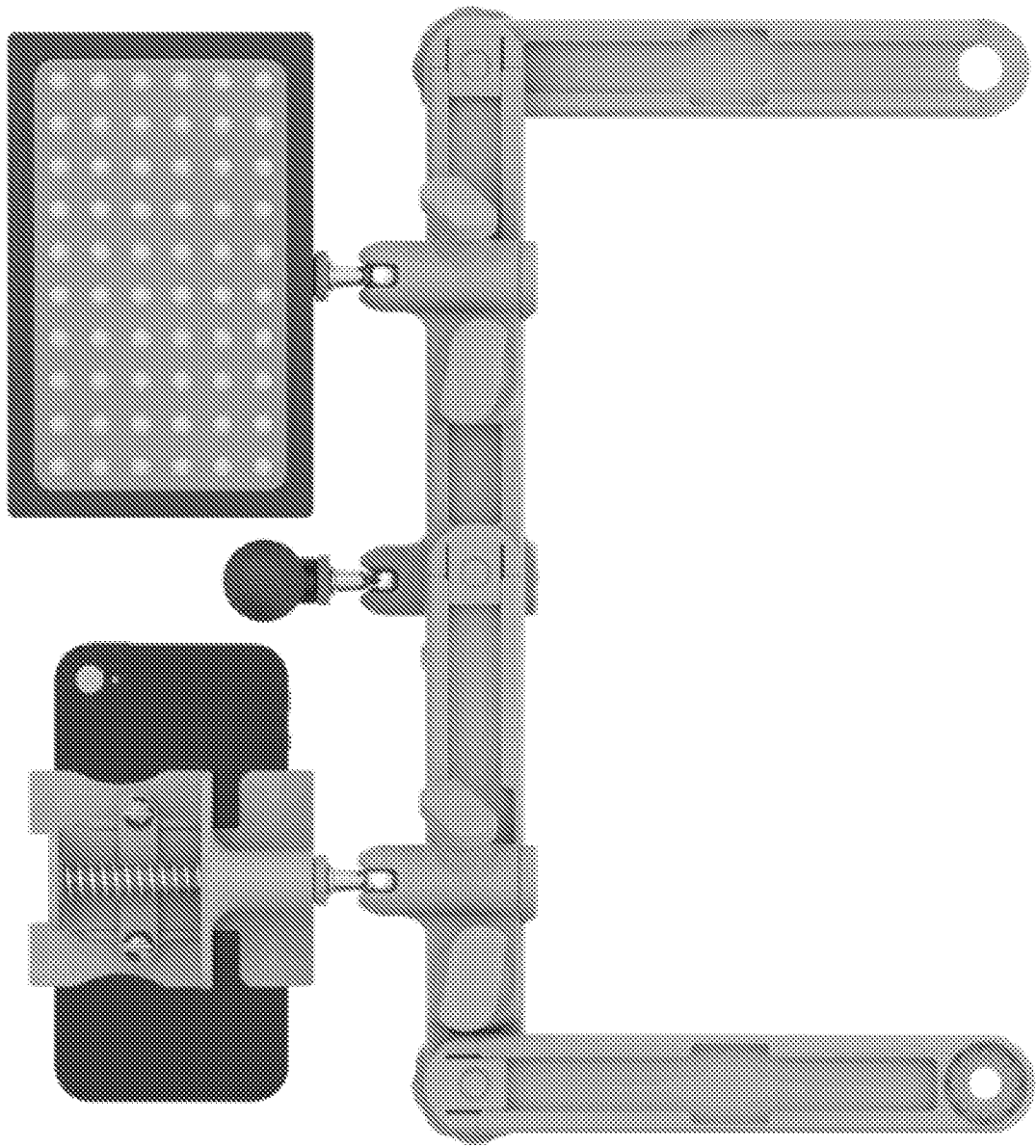


Figure 21

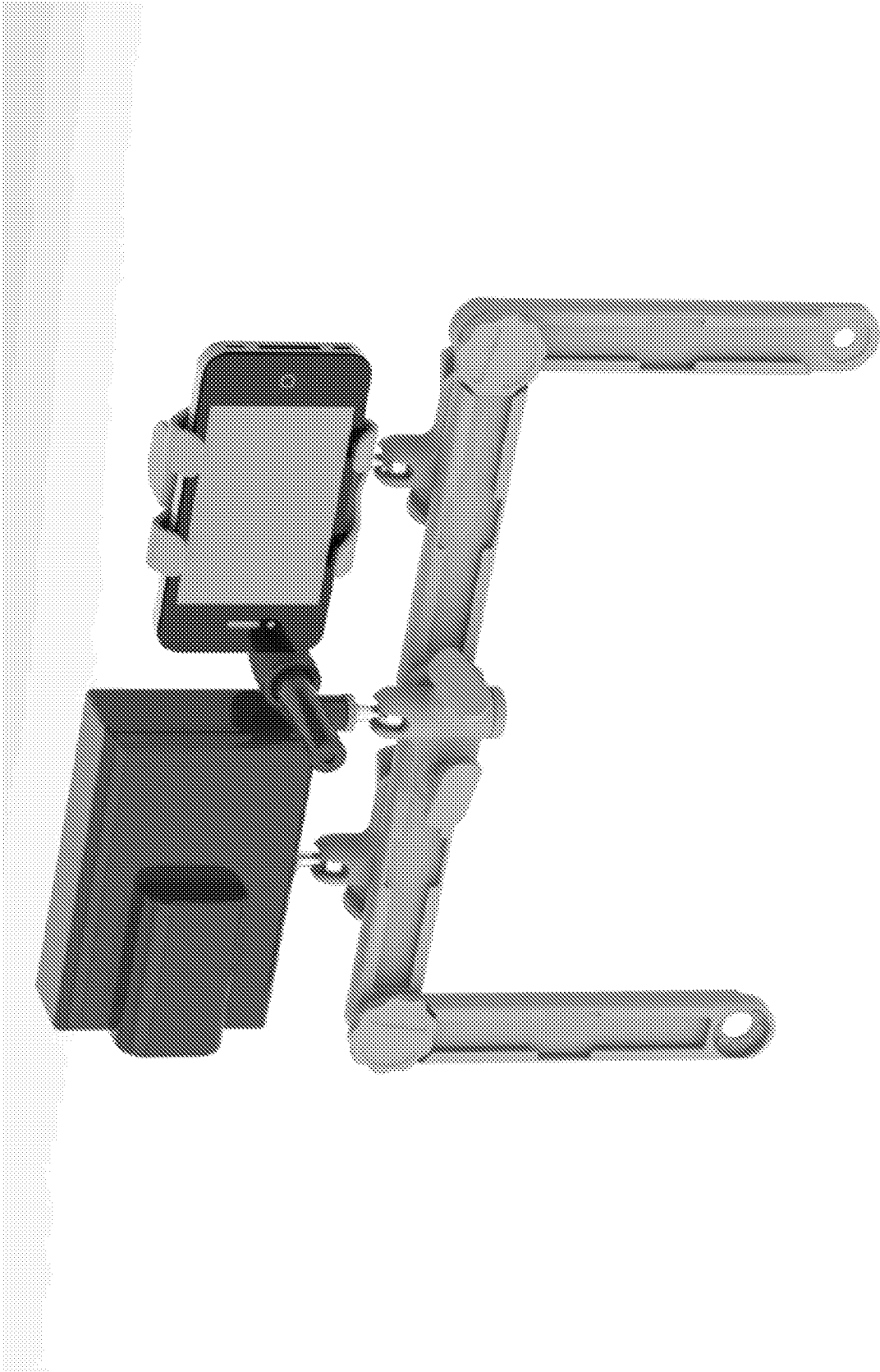


Figure 22

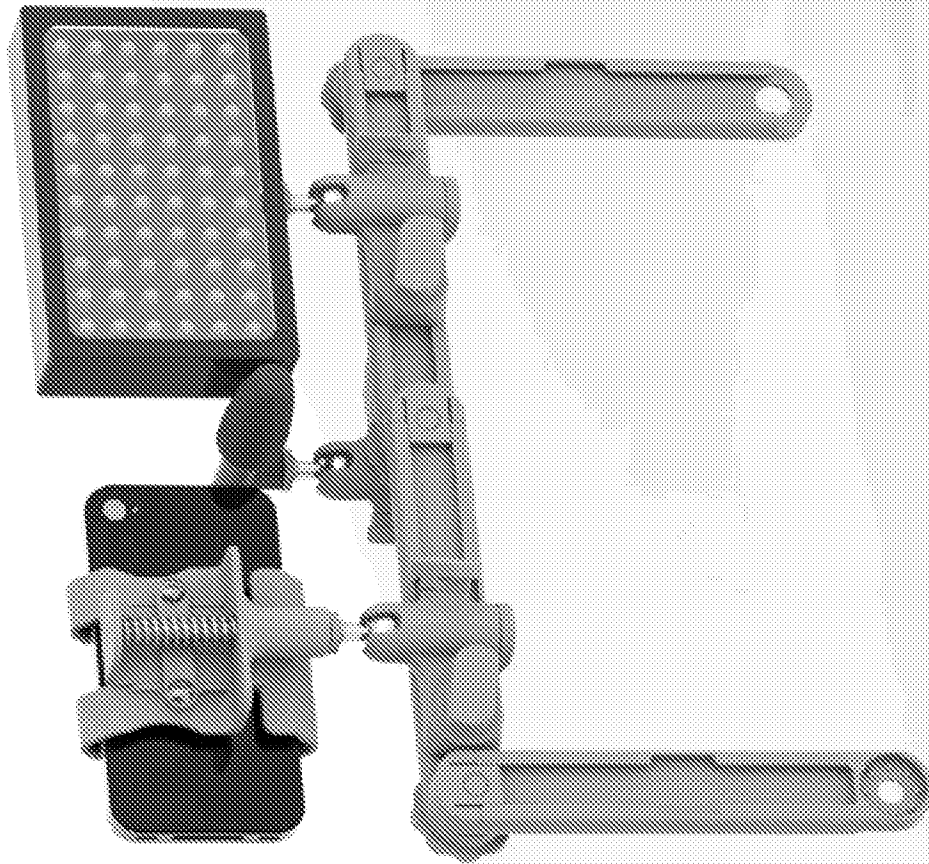


Figure 23

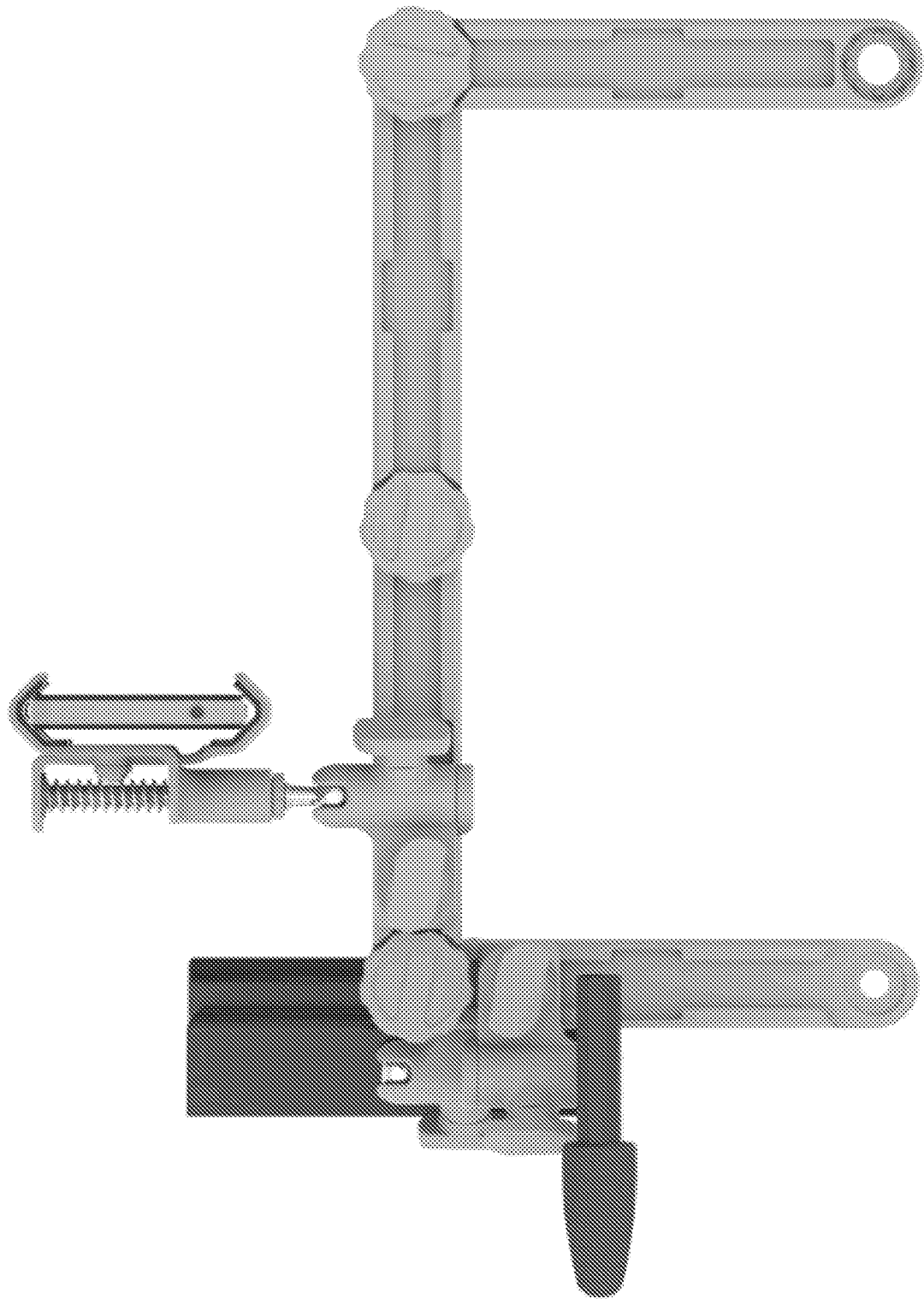


Figure 24



Figure 25



Figure 26

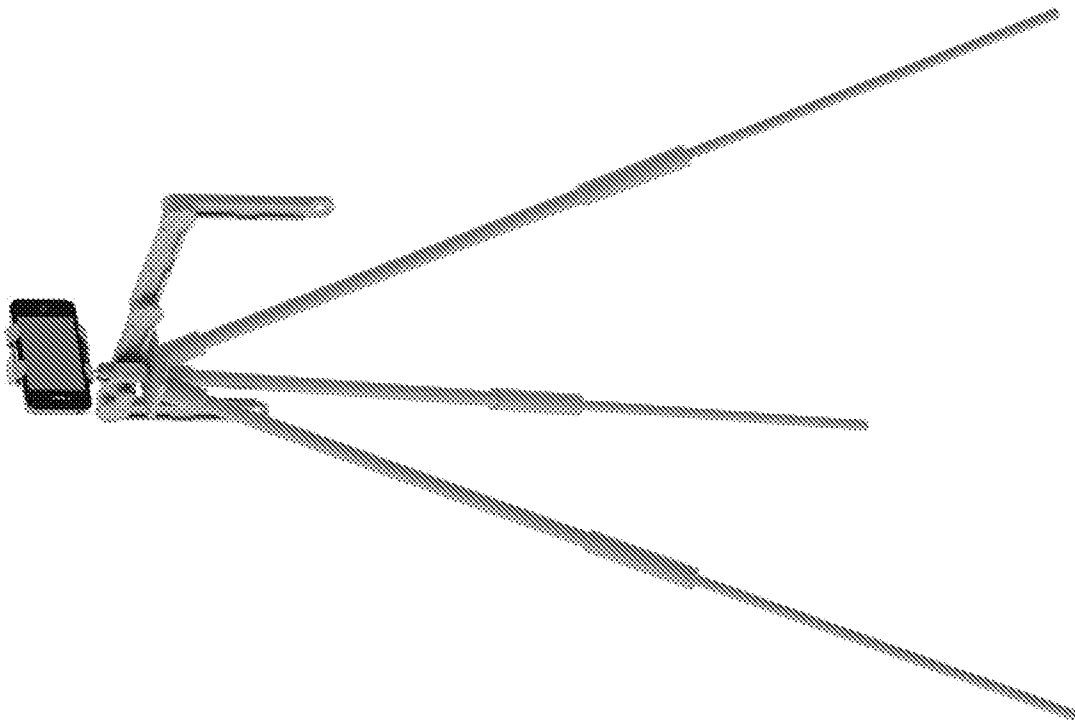


Figure 27

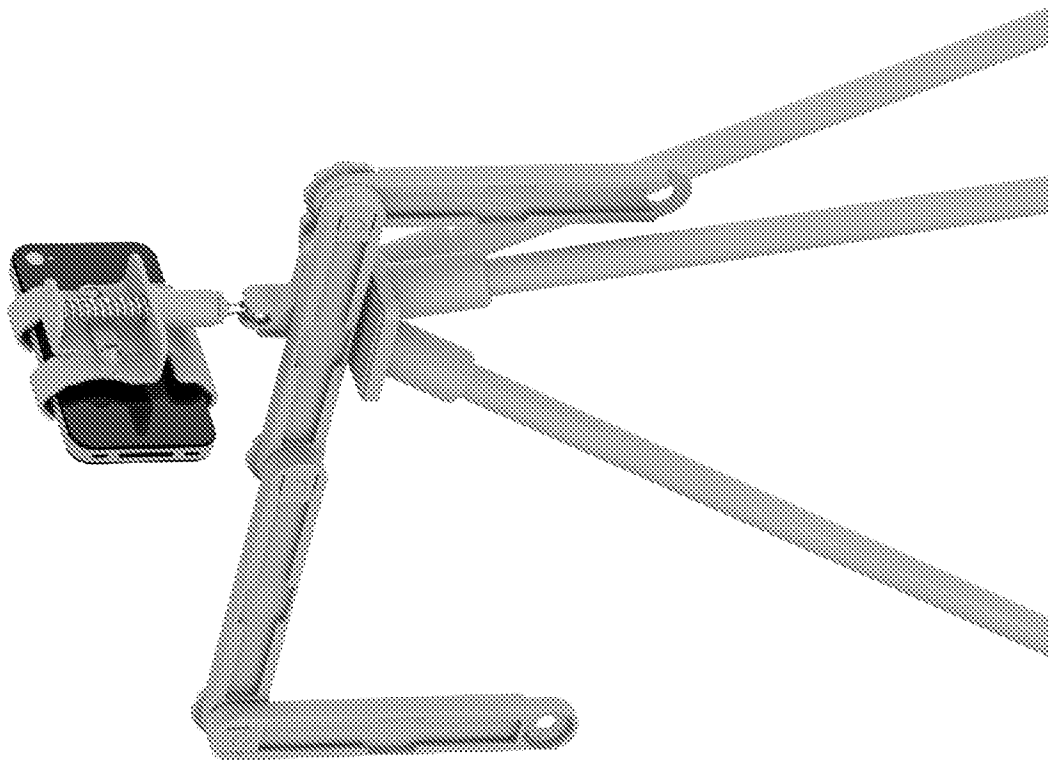


Figure 28

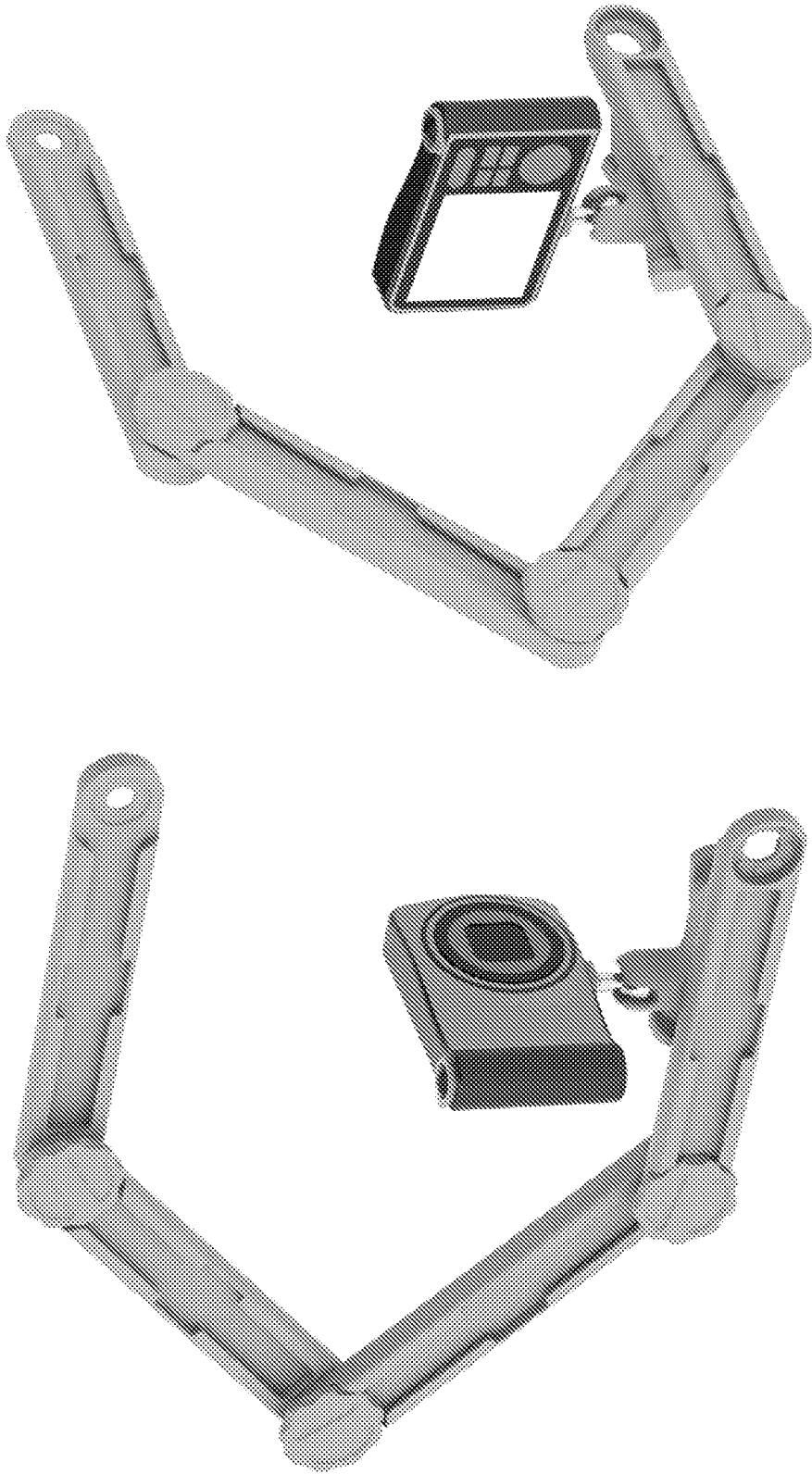


Figure 29



Figure 30

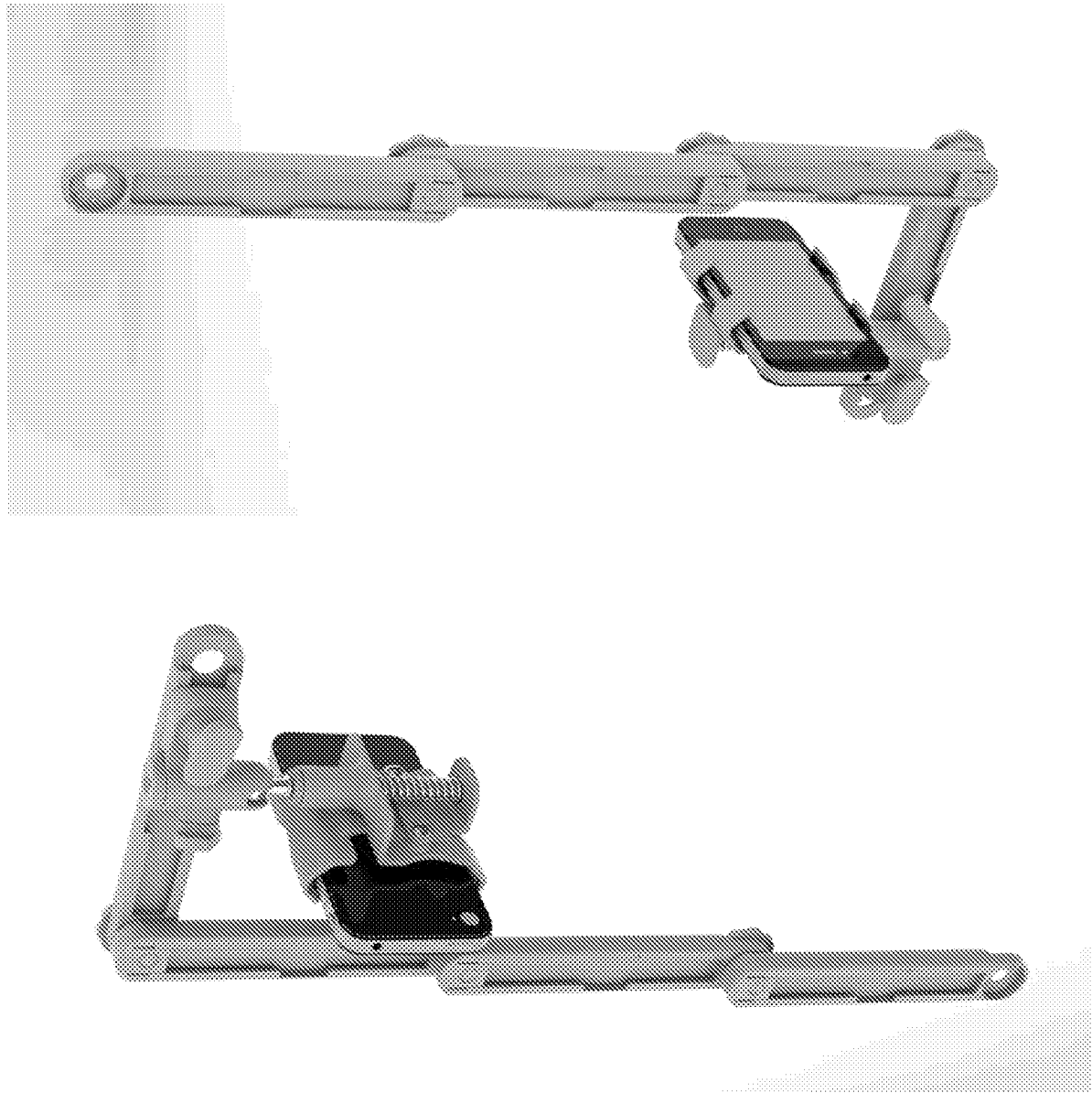


Figure 31

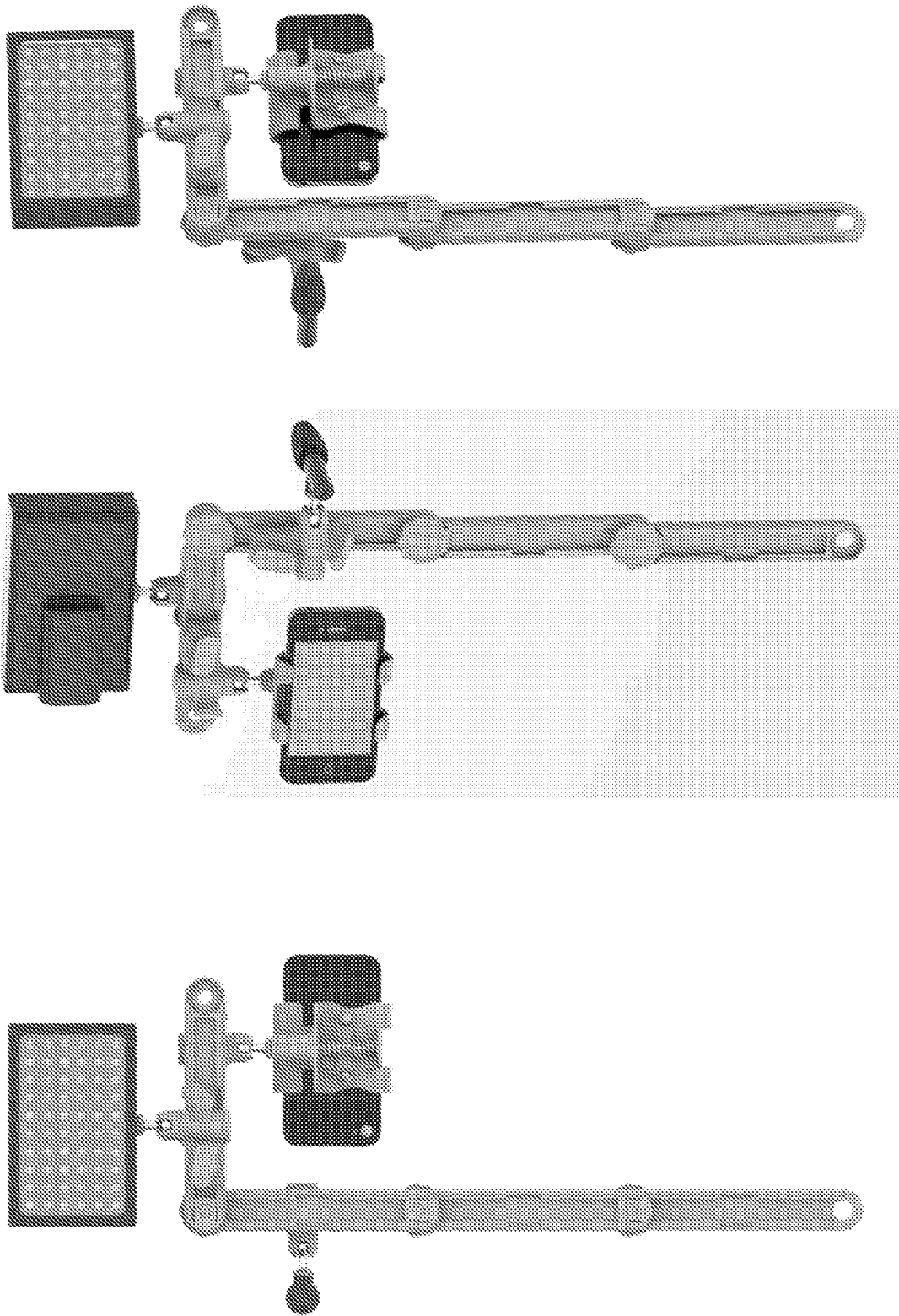


Figure 32

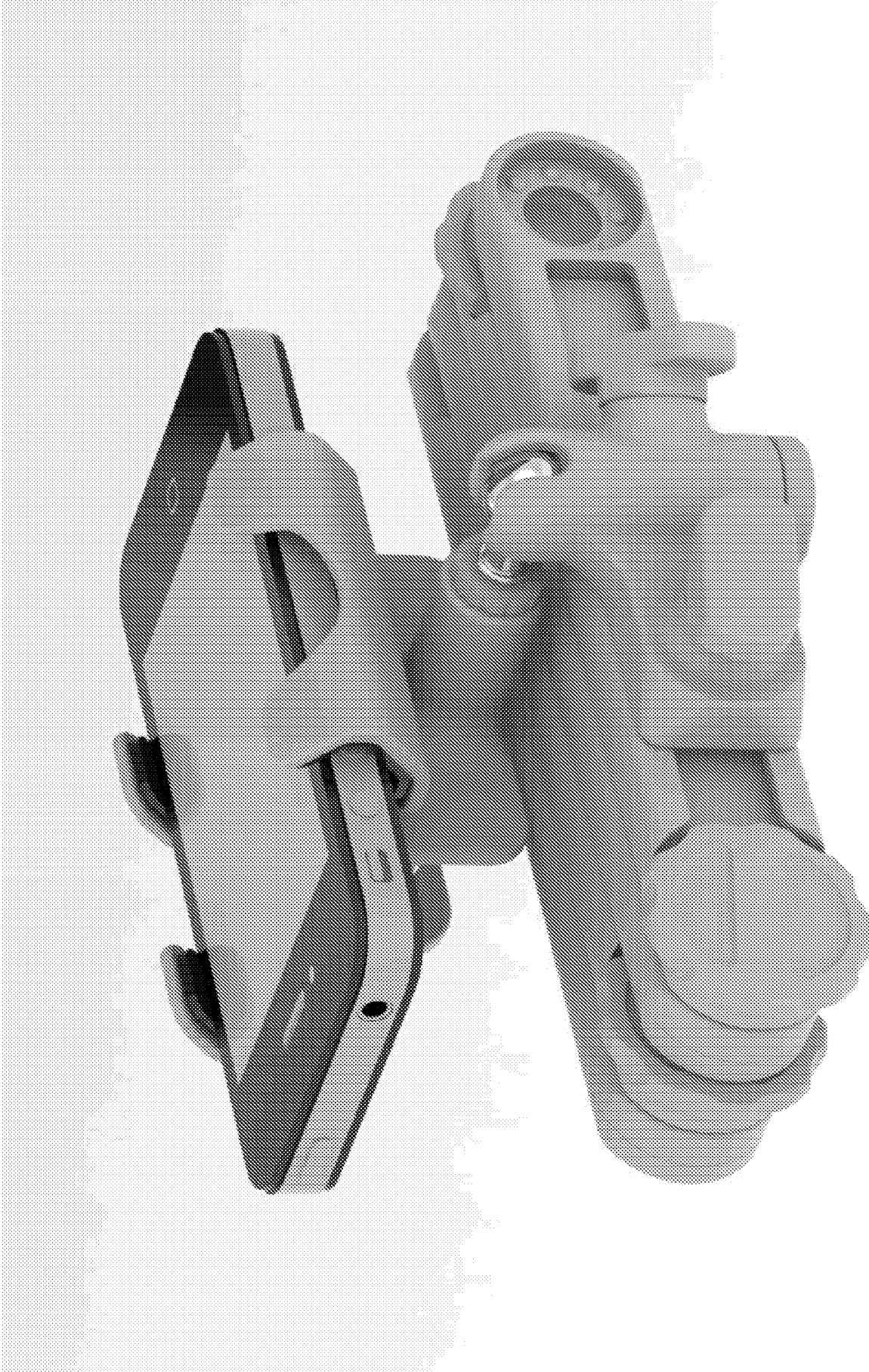


Figure 33



Figure 34

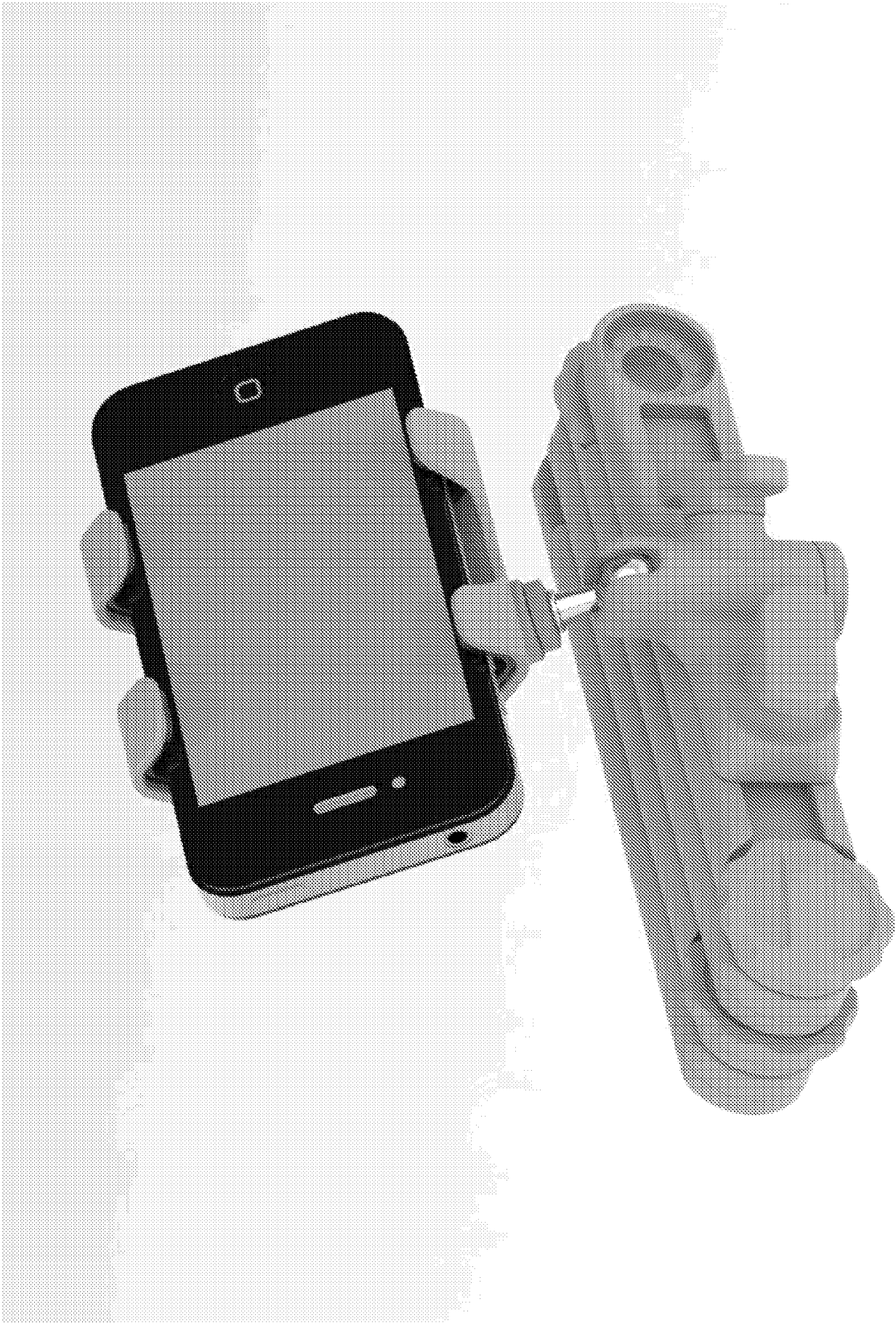


Figure 35

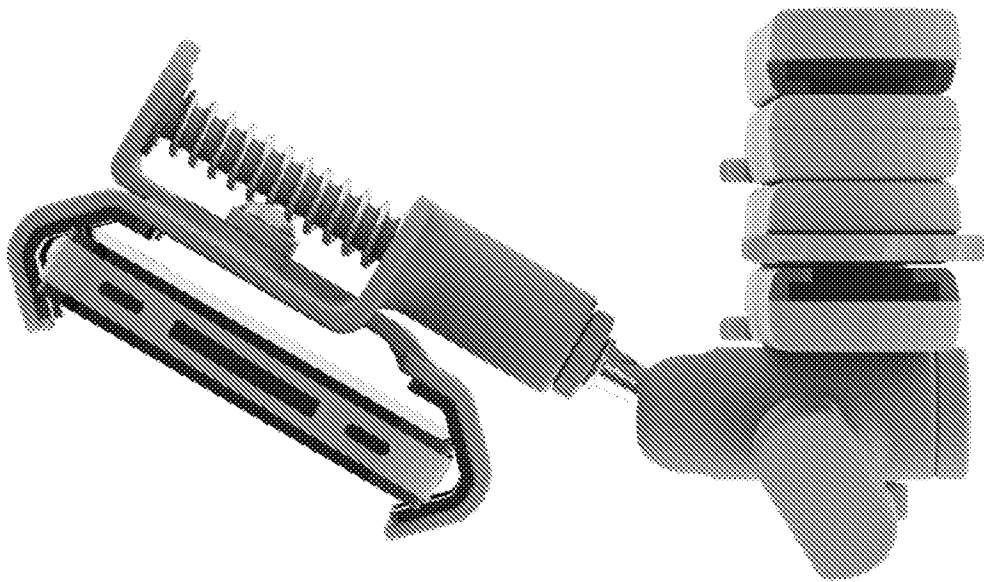


Figure 36



Figure 37

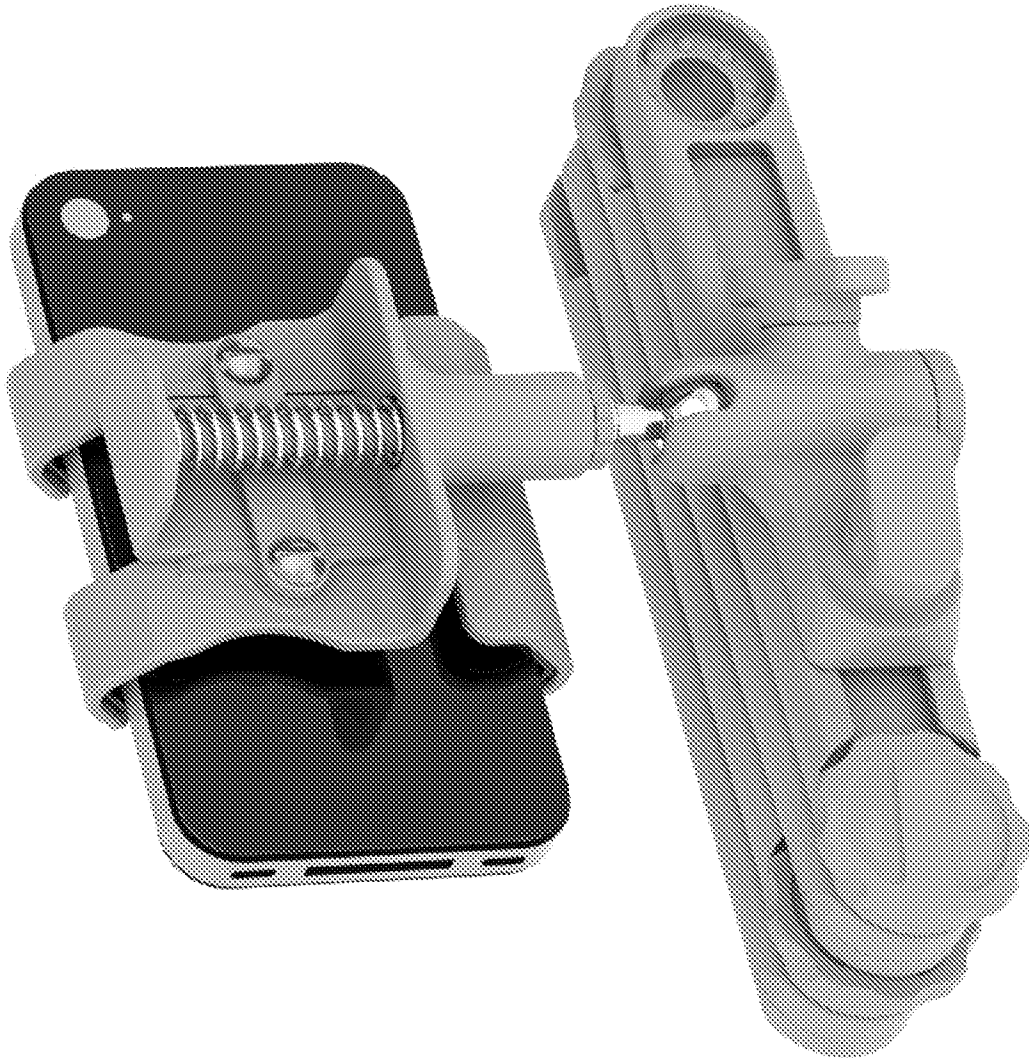


Figure 38

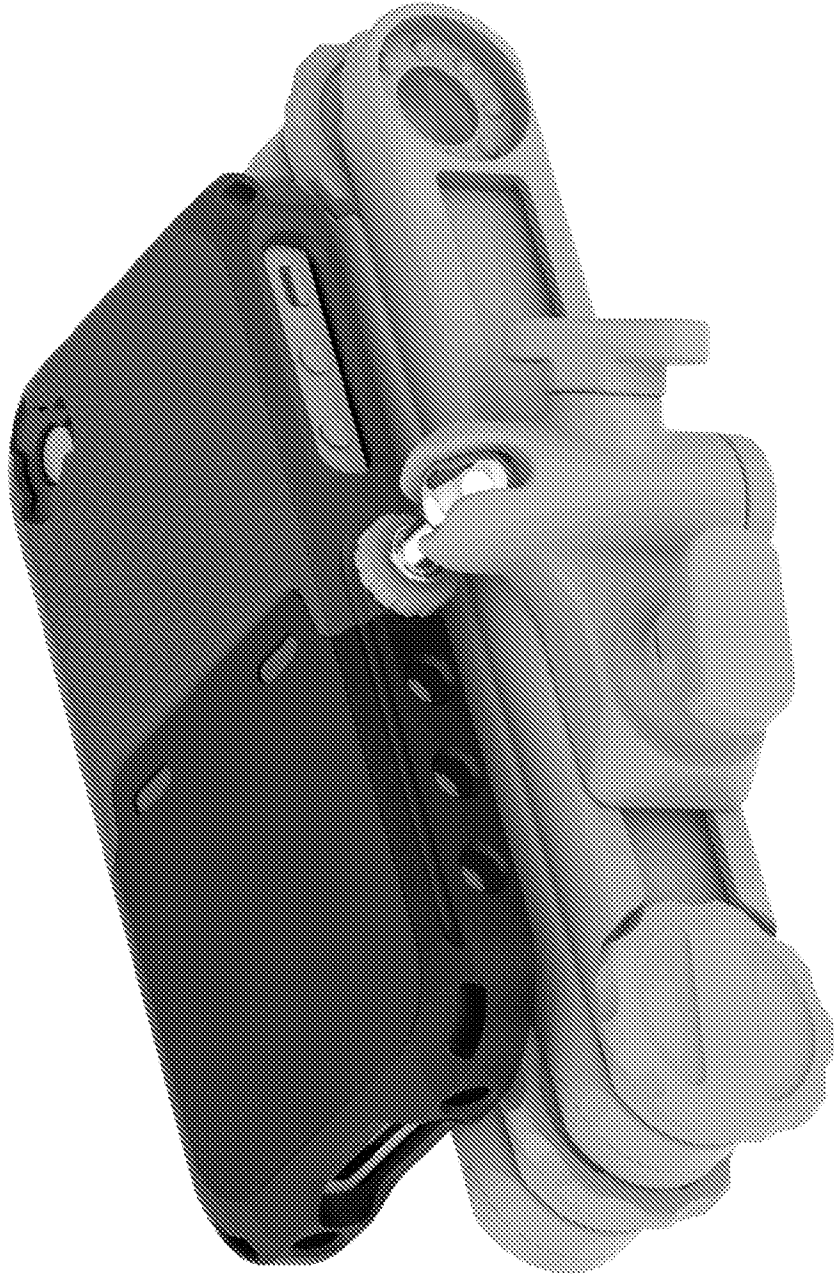


Figure 39

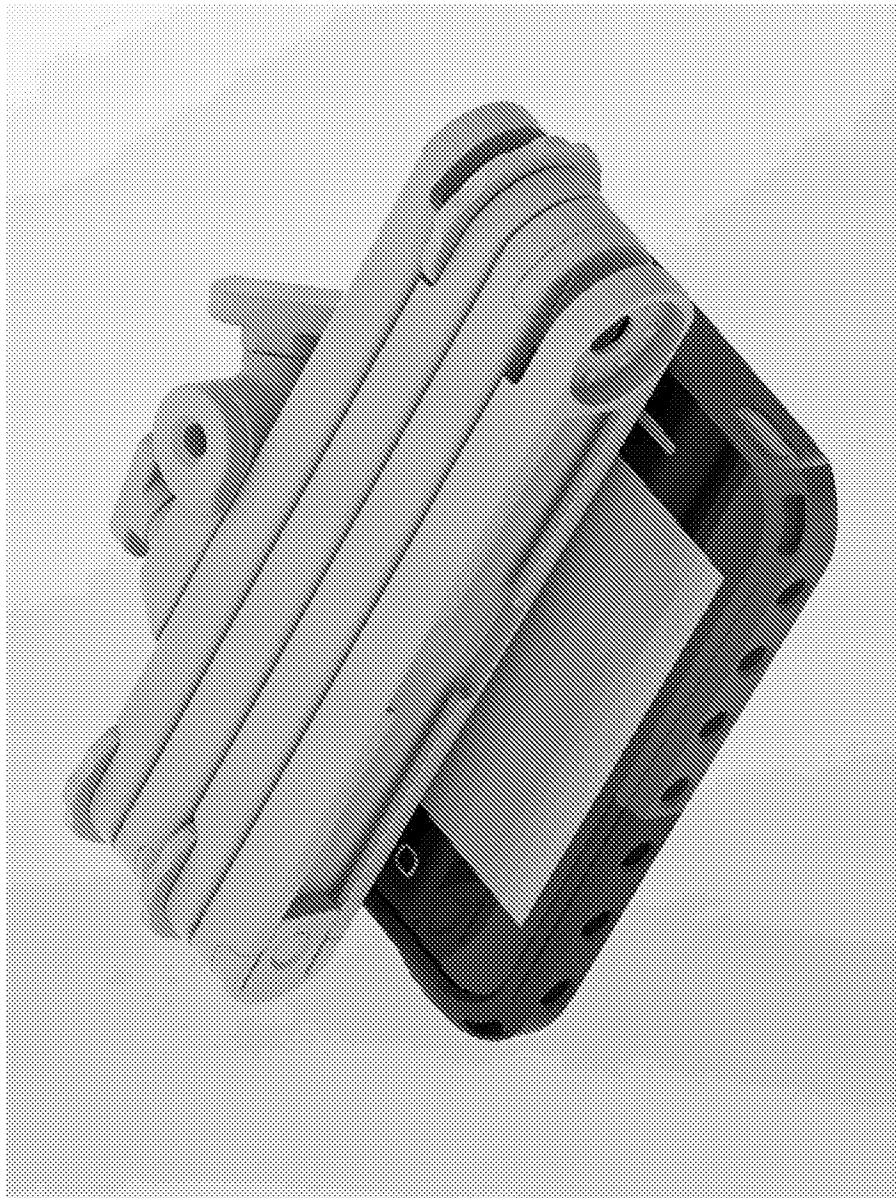


Figure 40

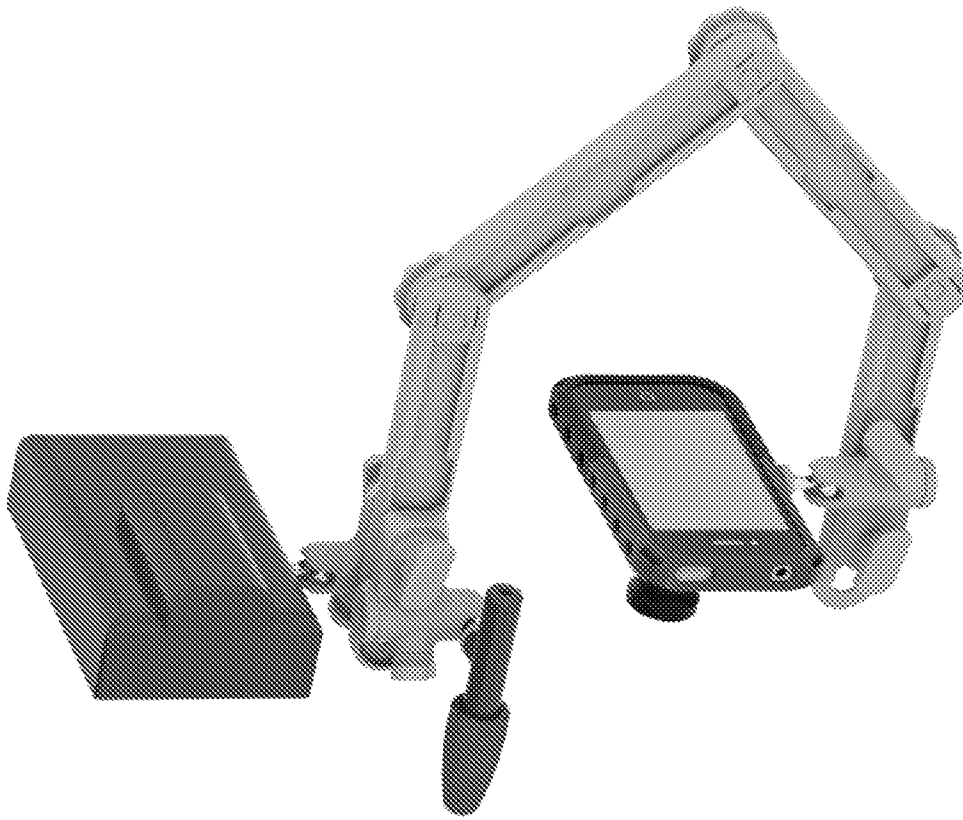


Figure 41

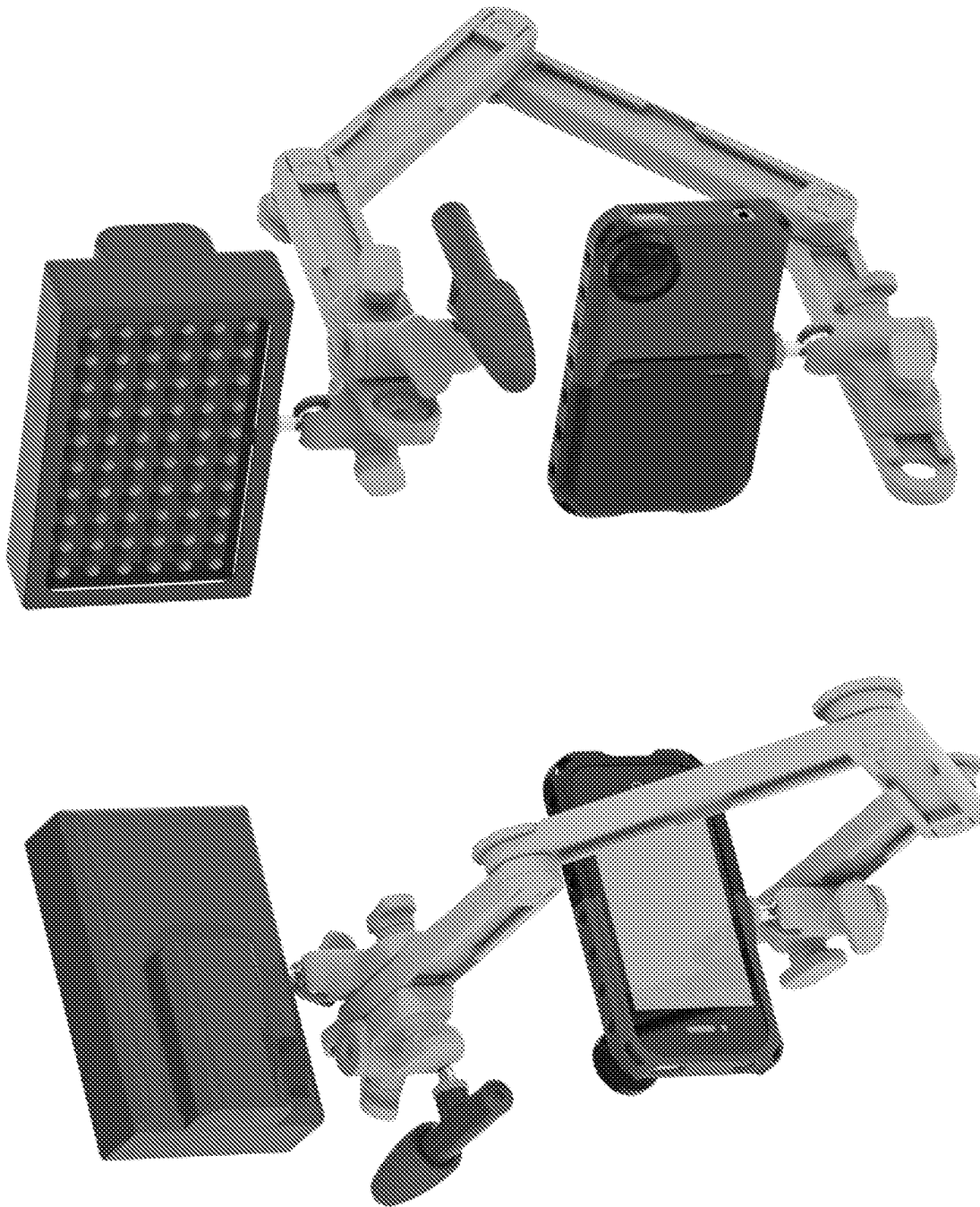


Figure 42

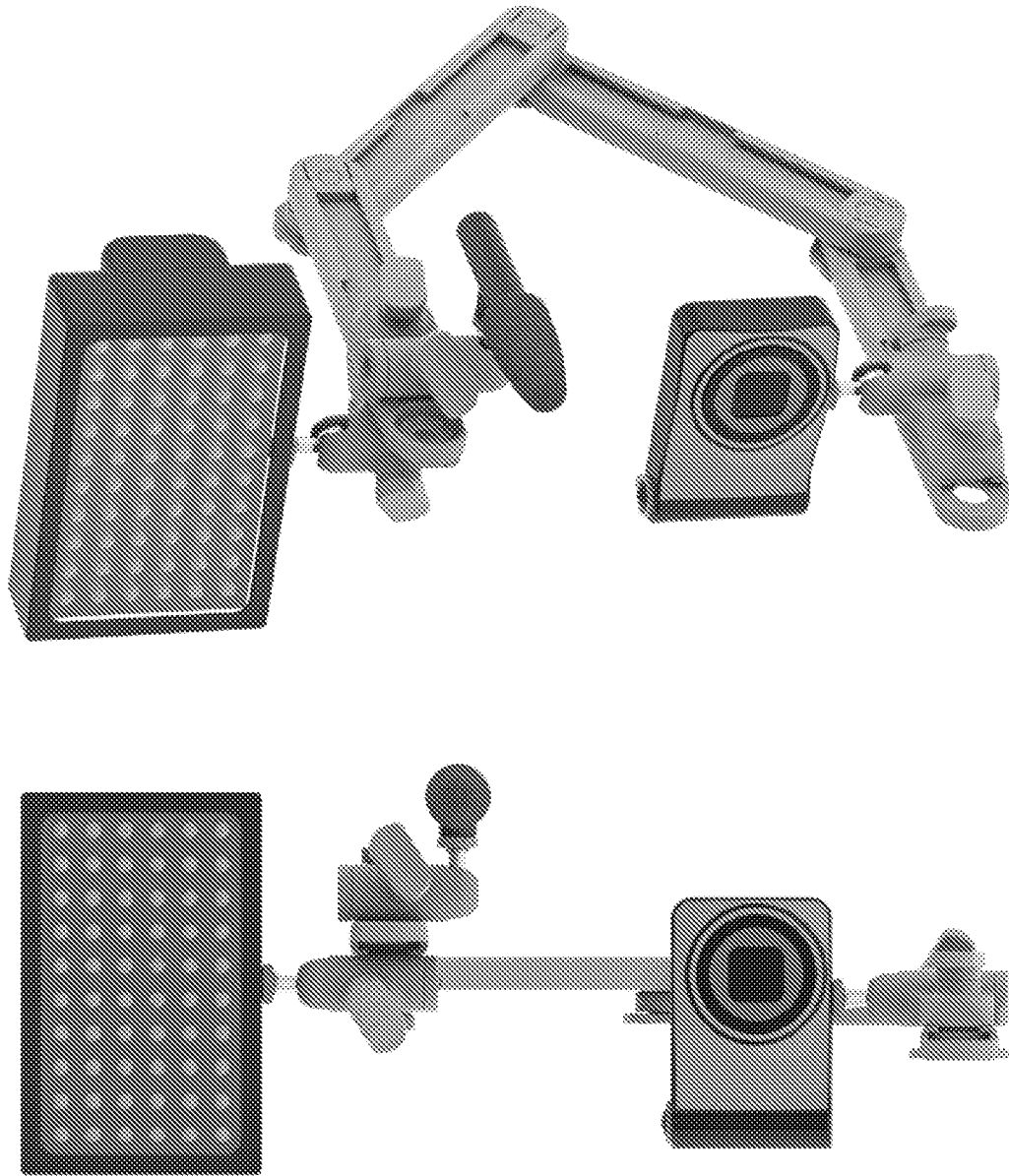


Figure 43

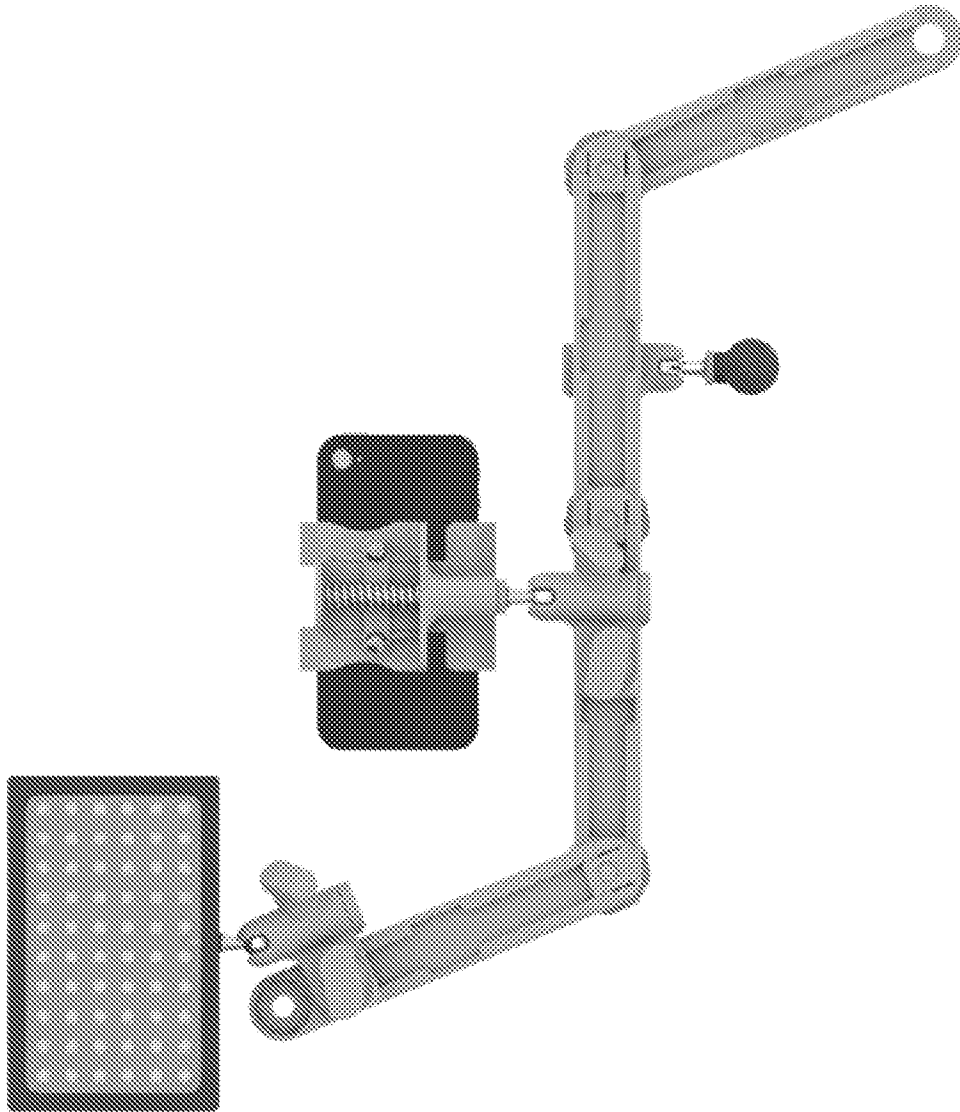


Figure 44



Figure 45

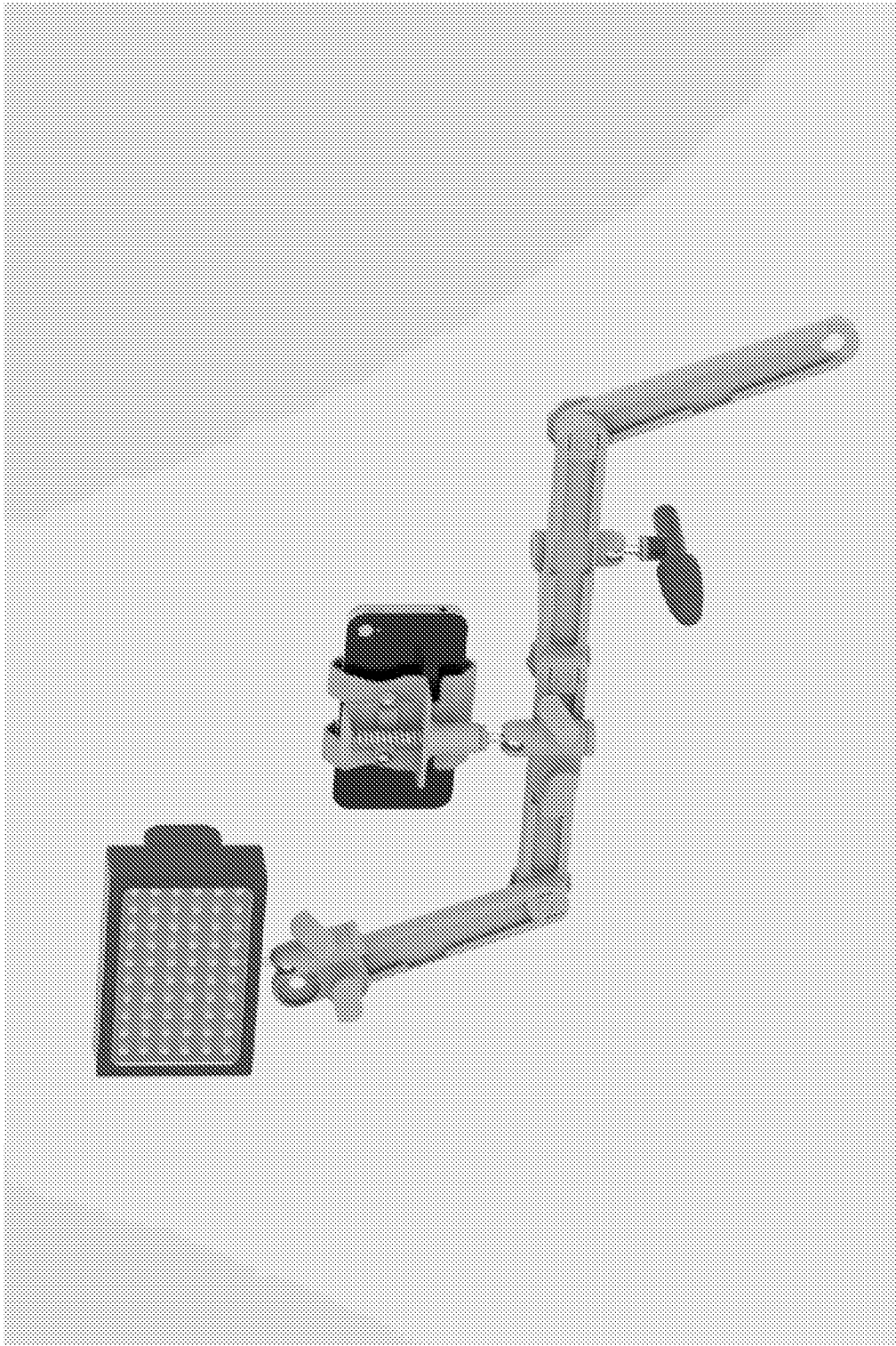


Figure 46

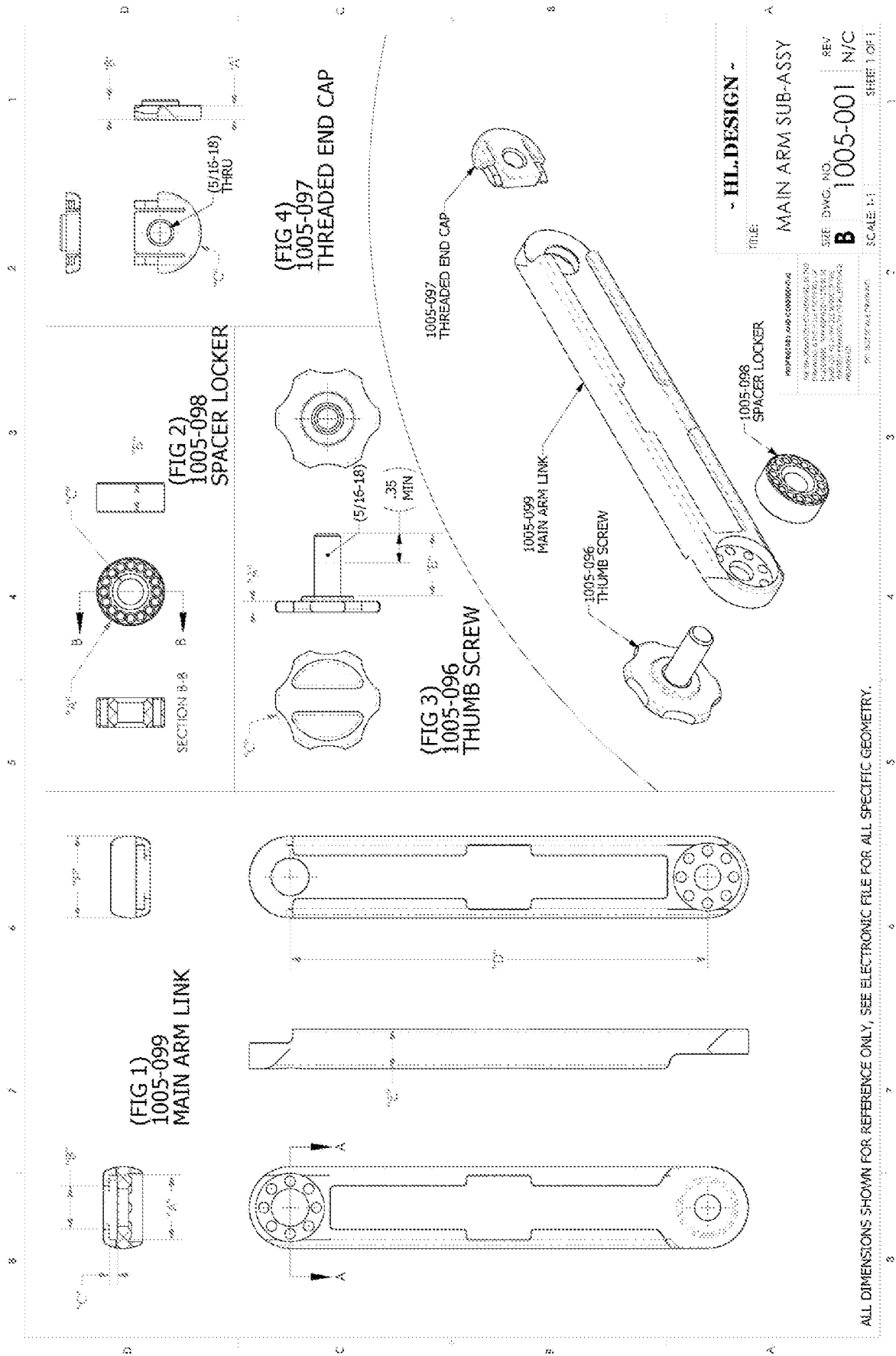


Figure 47

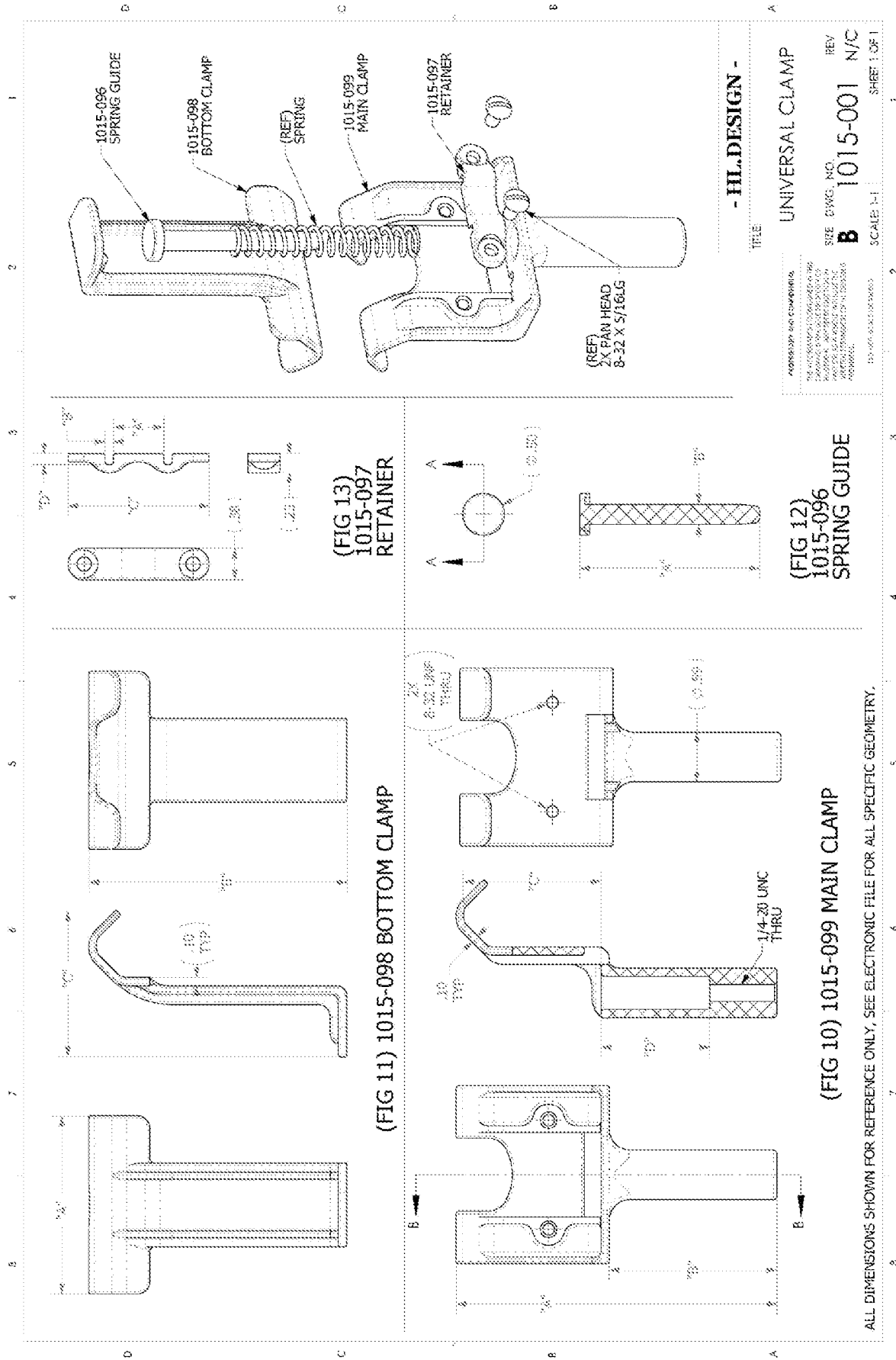


Figure 49

INTERNATIONAL SEARCH REPORT

47030059 01.08.2014
International application No.

PCT/US14/30059

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - E04G 3/28 (2014.01)
USPC - 248/278.1, 288.31
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - E04G 3/28 (2014.01)
USPC - 248/278.1, 288.31

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent (US Granted, US Applications, EP-A, EP-B, WO, JP, DE-G, DE-A, DE-T, DE-U, GB-A, FR-A); Google; Google Scholar; IEEE; ProQuest; IP.com; spring camera lock mount brace nut fasten-free spacer

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2011/0129210 A1 (MCGUCKEN, E) June 02, 2011; figures 3, 5; paragraphs [0059, 0060, 0062, 0063].	1-6, 9-15 ----- 7-8, 16-18
Y	US 7,753,330 B2 (BRIEF, Y) July 13, 2010; figures 2-4, column 2, lines 8, 15-16, column 3, lines 46-67.	7-8, 16-18
A	US 7,380,759 B1 (WHITESIDE, J. et al.) June 03, 2008; entire patent.	1-18
A	US 5,544,968 A (GOELLNER, W) August 13, 1996; entire patent.	1-18

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 26 June 2014 (26.06.2014)	Date of mailing of the international search report 01 AUG 2014
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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