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(54) **WIRELESSLY ACTUATED HYDROSTATIC SET MODULE**

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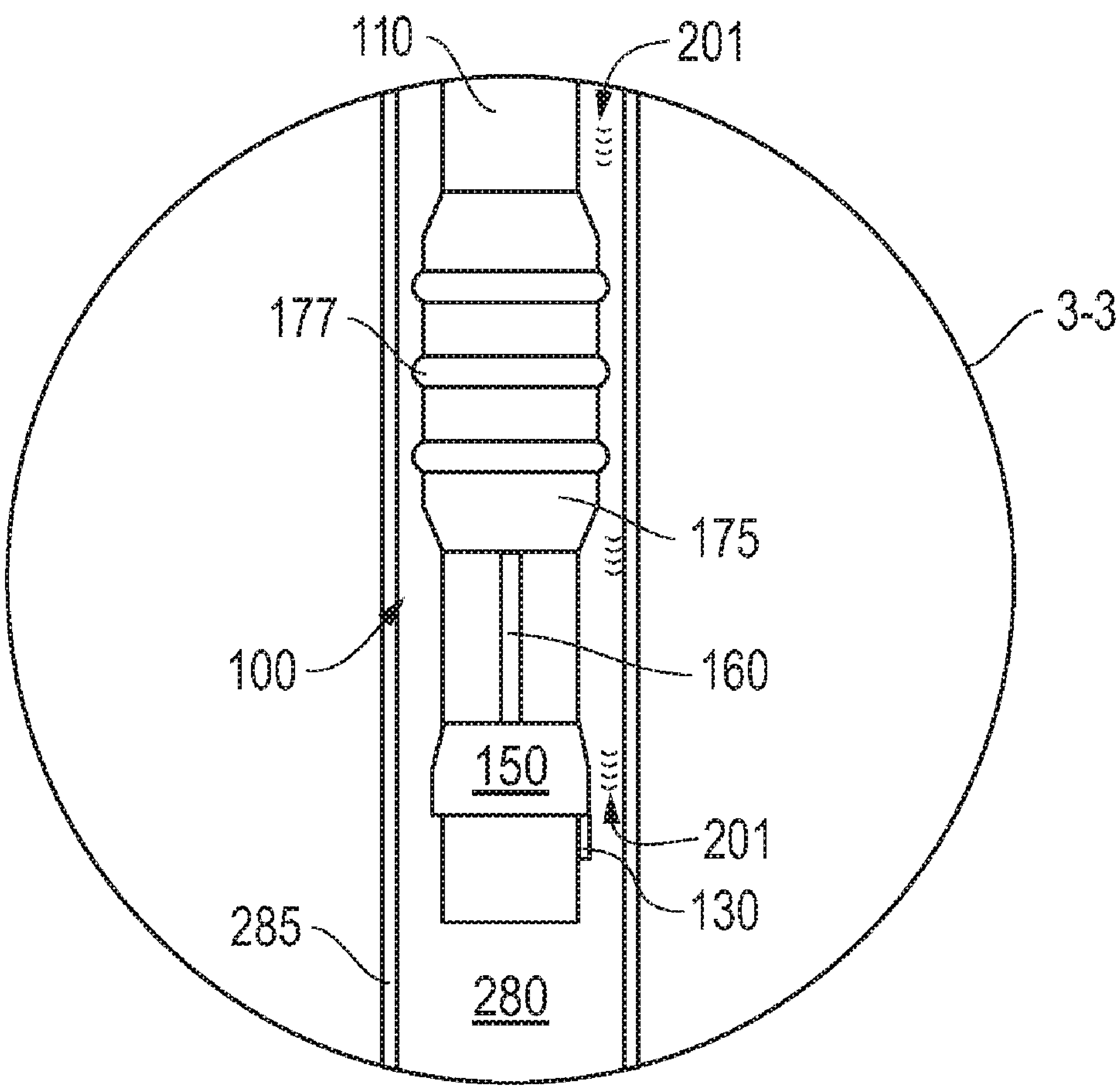
(52) **U.S. Cl.** ....................... **166/373**; 166/244.1; 166/113

(57) **ABSTRACT**

A hydrostatic set module configured with a wireless trigger mechanism to allow wireless activation thereof from an oil-field surface. The trigger mechanism includes a charge for exposing the module to wellbore pressures and allowing it to behave as an intensifier for actuation of a downhole device such as a production packer. The mechanism also includes a sensor for detection of the wireless communications along with a processor for analysis thereof and to direct spending of the charge. Pressure pulse or other wireless communication forms that are suitable for the downhole environment may be transmitted from surface in a variety of different signature patterns for responsive analysis by the trigger mechanism.



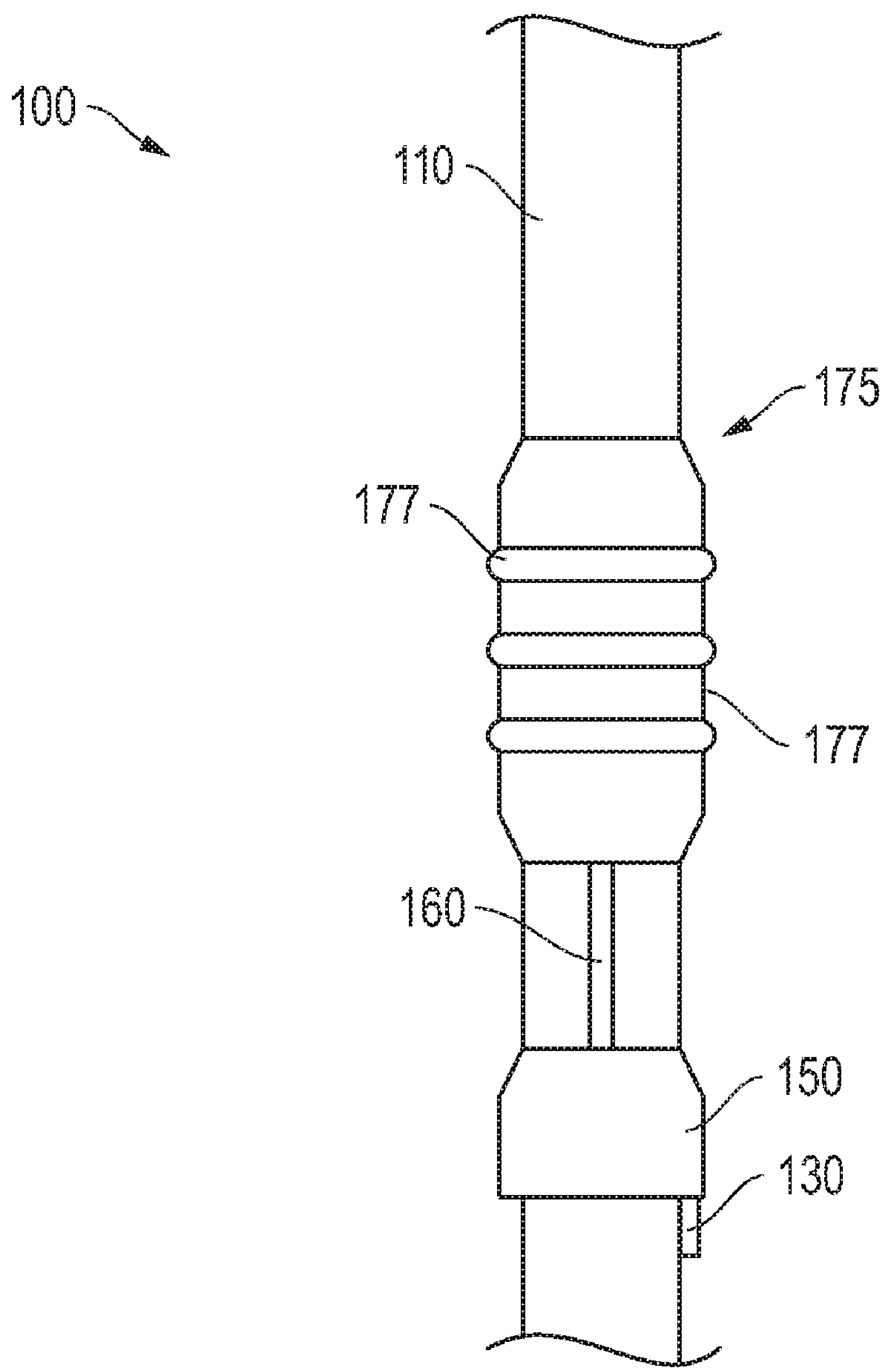



*FIG. 1*

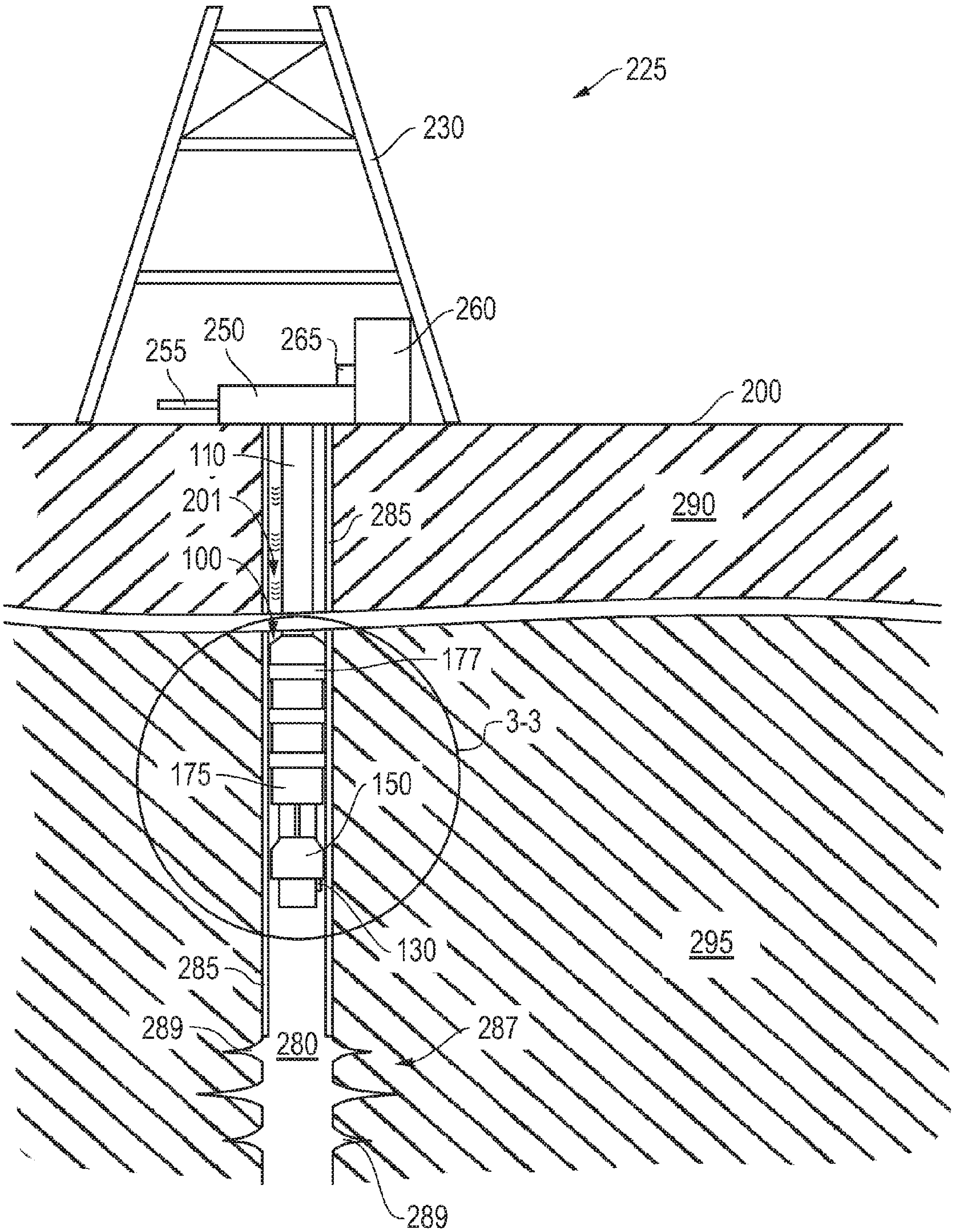

225
230
260
250
265
255
200
110
201
285
290
100
177
3-3
175
150
295
130
285
289
280
287
289

*FIG. 2*

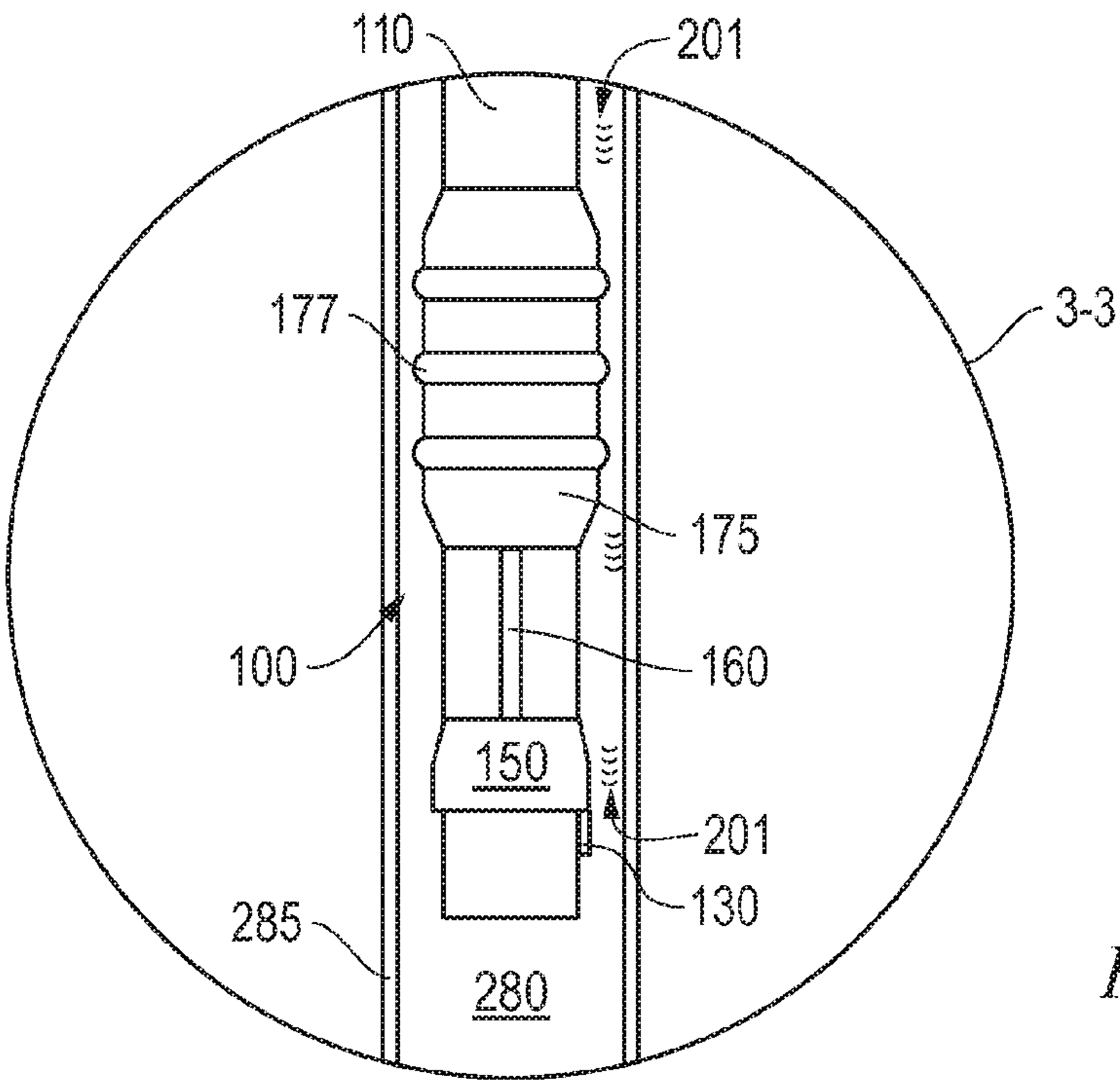

110
201
177
3-3
175
100
160
150
201
130
285
280

*FIG. 3A*

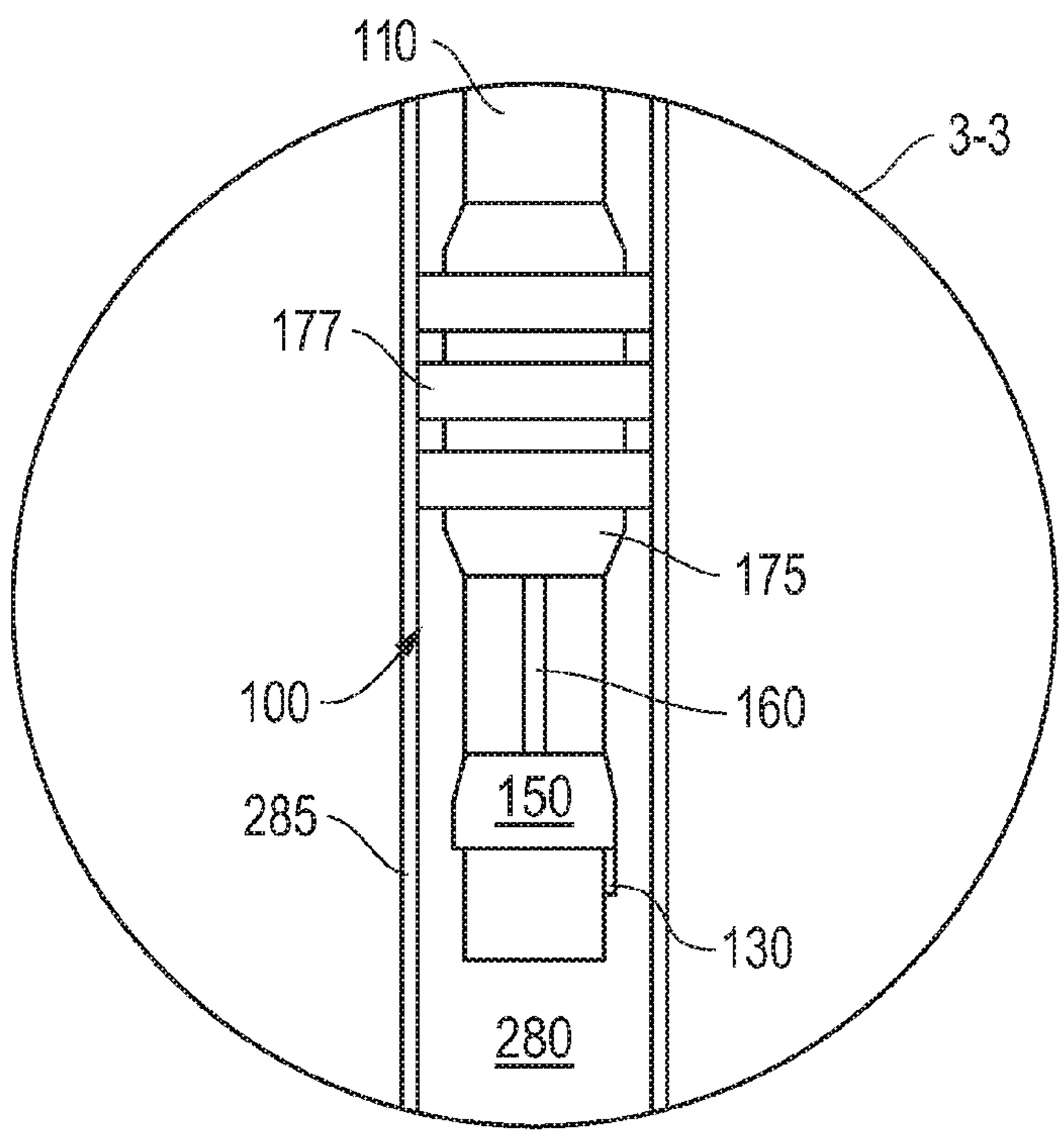

110
3-3
177
175
100
160
150
285
130
280

*FIG. 3B*

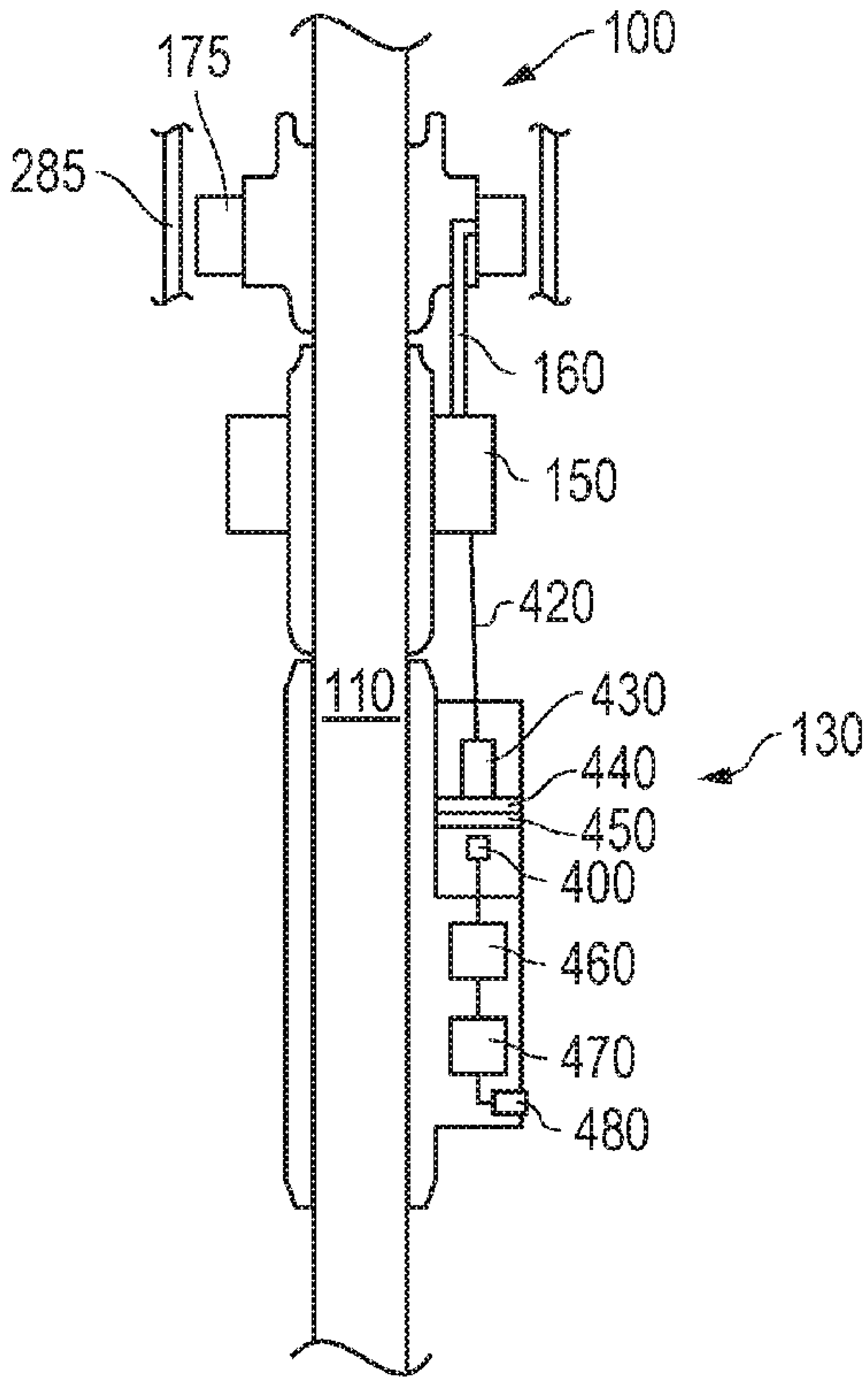

100
175
285
160
150
420
110
430
440
130
450
400
460
470
480

FIG. 4A

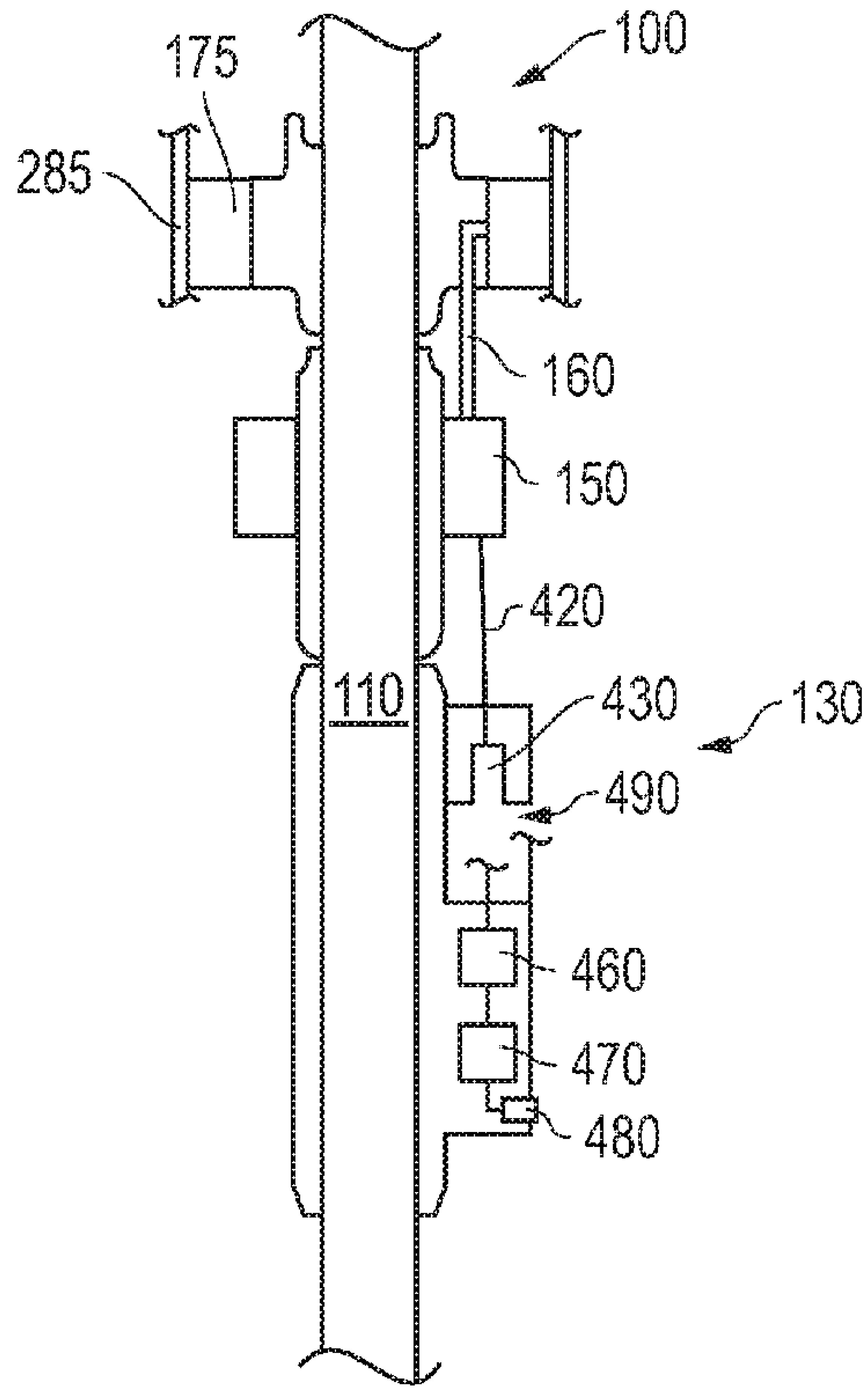

100
175
285
160
150
420
110
430
130
490
460
470
480

FIG. 4B

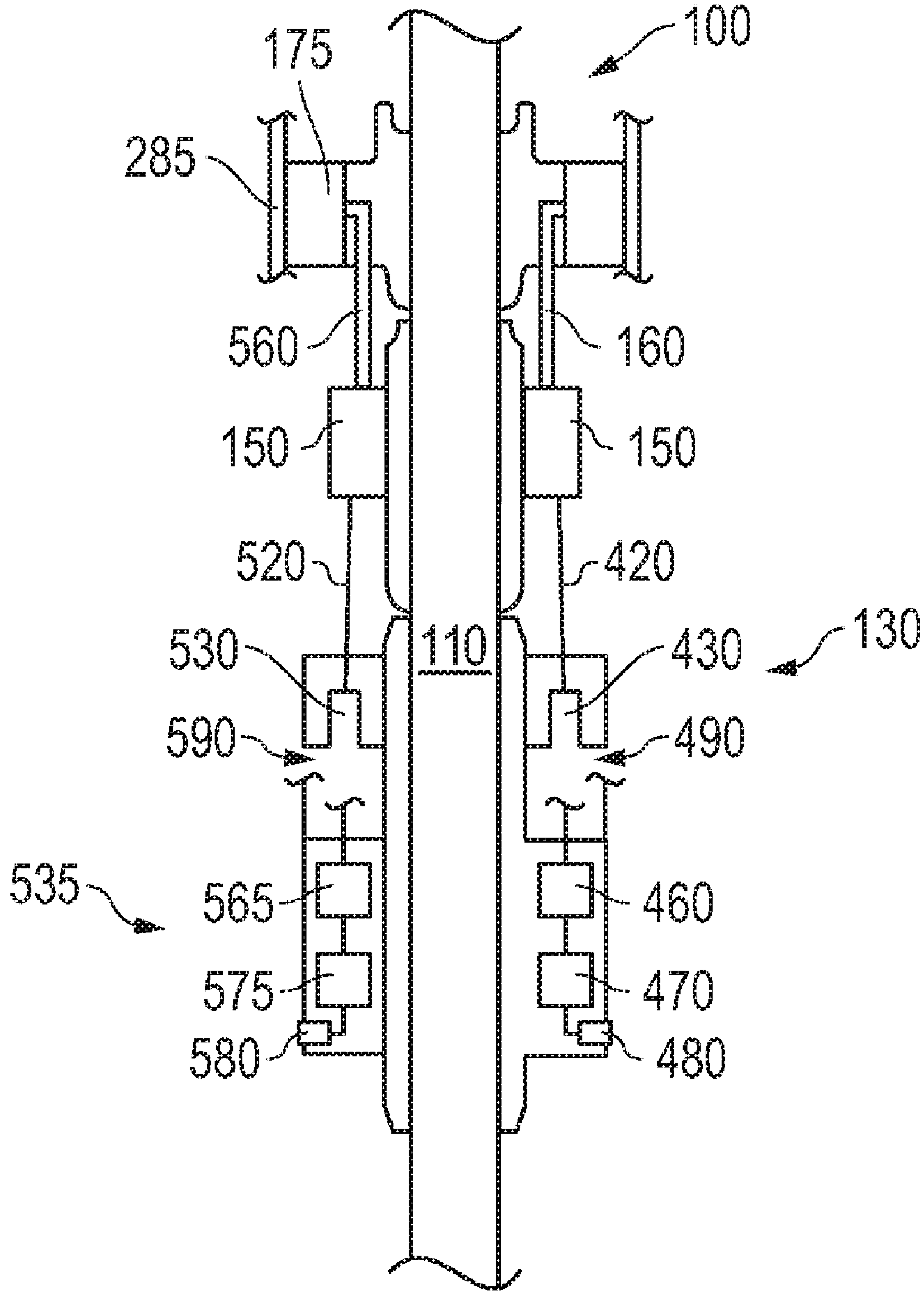

100
175
285
560
160
150
150
520
420
130
530
110
430
590
490
535
565
460
575
470
580
480

*FIG. 5*

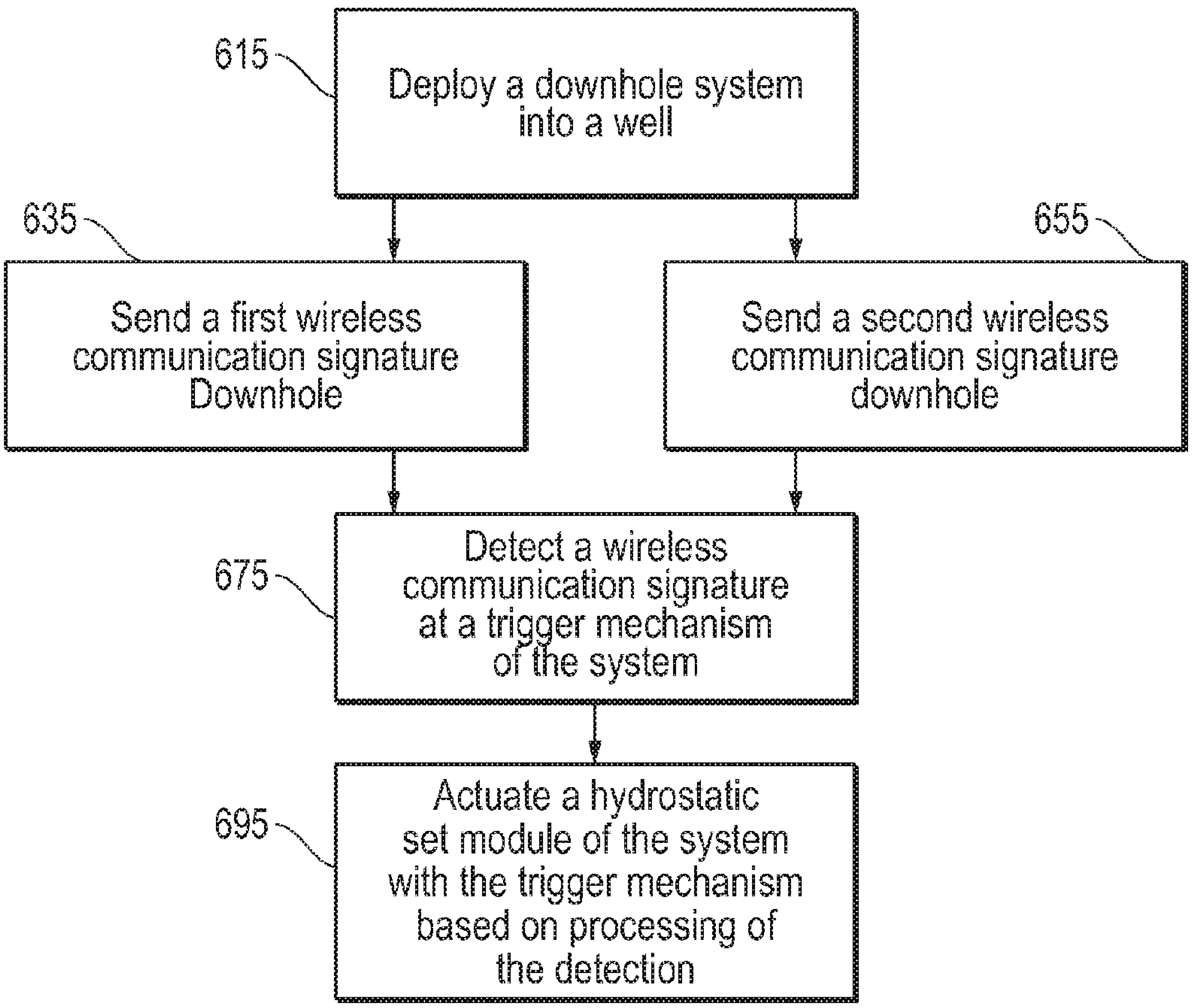

615
Deploy a downhole system into a well
635
Send a first wireless communication signature Downhole
655
Send a second wireless communication signature downhole
675
Detect a wireless communication signature at a trigger mechanism of the system
695
Actuate a hydrostatic set module of the system with the trigger mechanism based on processing of the detection

*FIG. 6*

# WIRELESSLY ACTUATED HYDROSTATIC SET MODULE

## PRIORITY CLAIM/CROSS REFERENCE TO RELATED APPLICATION(S)

**[0001]** This patent Document claims priority under 35 U.S.C. §119 to U.S. Provisional App. Ser. No. 61/293,255, filed on Jan. 8, 2010, and entitled, "Method and Apparatus for Setting a Packer", incorporated herein by reference in its entirety.

## FIELD

**[0002]** Embodiments described relate to hydrostatic setting modules for use in downhole environments. In particular, equipment and techniques for triggering a hydrostatic setting module are described. More specifically, wireless equipment and techniques may be utilized for such triggering without reliance on potentially more costly or stressful hydraulic triggering modes.

## BACKGROUND

**[0003]** Exploring, drilling and completing hydrocarbon and other wells are generally complicated, time consuming, and ultimately very expensive endeavors. As a result, over the years, a significant amount of added emphasis has been placed on overall well architecture, monitoring and follow on interventional maintenance. Indeed, perhaps even more emphasis has been directed at minimizing costs associated with applications in furtherance of well construction, monitoring and maintenance. All in all, careful attention to the cost effective and reliable execution of such applications may help maximize production and extend well life. Thus, a substantial return on the investment in the completed well may be better ensured.

**[0004]** In line with the objectives of maximizing cost effectiveness and overall production, the well may be of a fairly sophisticated architecture. For example, the well may be tens of thousands of feet deep, traversing various formation layers, and zonally isolated throughout. That is to say, packers may be intermittently disposed about production tubing which runs through the well so as to isolate various well regions or zones from one another. Thus, production may be extracted from certain zones through the production tubing, but not others. Similarly, production tubing that terminates adjacent a production region is generally anchored or immobilized in place thereat by a mechanical packer, irrespective of any zonal isolation.

**[0005]** A packer, such as the noted mechanical packer, may be secured near the terminal end of the production tubing and equipped with a setting mechanism. The setting mechanism may be configured to drive the packer from a lower profile to a radially enlarged profile. Thus, the tubing may be advanced within the well and into position with the packer in a reduced or lower profile. Subsequently, the packer may be enlarged to secure the tubing in place adjacent the production region.

**[0006]** Once the production tubing is in place, activation of the setting mechanism is often hydraulically triggered. For example, the mechanism may be equipped with a trigger that is responsive to a given degree of pressure induced within the production tubing. So, for example, surface equipment and pumps adjacent the well head may be employed to induce a pressure differential of between about 3,000 and 4,000 PSI into the well. Depending on the location of the trigger for the setting mechanism, this driving up of pressure may take place through the bore of the production tubing or through the annulus between the tubing and the wall of the well.

**[0007]** Unfortunately, the noted hydraulic manner of driving up pressure for triggering of the setting mechanism may place significant stress on the production tubing. For example, where the hydraulic pressure is induced through the tubing bore, the strain on the tubing may lead to ballooning. Furthermore, the strain on the tubing may have long term effects. That is to say, even long after setting the packer, strain placed on the tubing during the hydraulic setting of the packer may result in failure, for example, during production operations. To avoid such a catastrophic event, whenever pressure tolerances are detectably exceeded, the entire production tubing string and packer assembly may be removed, examined, and another deployment of production equipment undertaken. Ultimately, this may eat up a couple of days' time and upwards of $100,000 in expenses. Once more, even where such hazards are avoided, the induction of sufficient pressure within the tubing requires the installation and removal of a plug within the tubing near its terminal end. Thus, the undesirable costs of additional runs in the well are introduced along with the plugs' own failure modes.

**[0008]** Alternatively, pressurization of the annulus as a means to trigger the setting mechanism requires that the lower, generally open-hole, completions assembly be isolated. Generally this would involve the closing of a formation isolation valve or other barrier valve above the lower completions. Unfortunately, such a valve may not always be present. Once more, such valves come with their own inherent expense, installation cost, and failure modes, not to mention the activation time and techniques which must be dedicated to operation of the valve.

**[0009]** In order to avoid the costly scenario of having to remove and re-deploy the entire production string or rely on a lower completion barrier valve, a setting mechanism may be employed that is hydraulically wired to the surface. So, for example, a hydrostatic set module may be utilized that includes a dedicated hydraulic control line run all the way to surface. As a result, exposure of the production tubing to dramatic pressure increases for packer deployment is eliminated as is the need to rely on plug placement or barrier valve operation.

**[0010]** Unfortunately, the utilization of a dedicated hydraulic line for the setting mechanism only shifts the concerns over hydraulic deployment from potential production tubing stressors, plug placements, or barrier valve issues to issues with other downhole production equipment. For example, a dedicated hydraulic line is itself an added piece of production equipment. Thus, it comes with its own added expenses and failure modes. Indeed, due to the fact that a new piece of equipment is introduced, the possibility of defective production string equipment is inherently increased even before a setting application is run. Once more, where such defectiveness results in a failure, the same amount of time and expenses may be lost in removal and re-deployment of the production string. Thus, the advantages obtained from protecting the production tubing by utilization of a dedicated hydraulic line for the setting mechanism may be negligible at best.

## SUMMARY

**[0011]** A downhole system is provided that includes a hydraulically actuated mechanism along with a hydrostatic set module. The module is hydraulically coupled to the mechanism for its actuation. Additionally, the module is outfitted with a wireless trigger to initiate its own activation to attain the noted actuation of the mechanism.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0012]** FIG. **1** depicts a front view of an embodiment of a wirelessly triggered hydrostatic set module in conjunction with a packer assembly.

**[0013]** FIG. **2** is an overview of an oilfield accommodating a well with the module and assembly of FIG. **1** disposed therein.

**[0014]** FIG. **3**A is an enlarged view of the module and assembly taken from **3-3** of FIG. **2** and revealing wireless pressure pulse communication through the well.

**[0015]** FIG. **3**B reveals the module and assembly of FIG. **3**A with the packer of the assembly set in the well by the module in response to the wireless communication.

**[0016]** FIG. **4**A is a schematic view of an embodiment of a wirelessly triggered hydrostatic set module and downhole actuatable tool such as a packer assembly.

**[0017]** FIG. **4**B is a schematic view of the module and assembly of FIG. **4**B following wireless actuation of the module.

**[0018]** FIG. **5** is a schematic view of an alternate embodiment of a wirelessly triggered hydrostatic set module employing redundant wireless triggering.

**[0019]** FIG. **6** is a flow-chart summarizing an embodiment of employing a wirelessly triggered hydrostatic set module.

## DETAILED DESCRIPTION

**[0020]** Embodiments herein are described with reference to certain downhole setting applications. For example, embodiments depicted herein are of a packer being set downhole as part of a production assembly. However, a variety of alternate applications utilizing a hydrostatic set module may employ wireless triggering and techniques as detailed herein. Furthermore, as used herein, the term “wireless” is meant to refer to any communication that takes place without the requirement of an optical or electrical wire, hydraulic line, or any other form of hard line substantially dedicated to supporting communications.

**[0021]** Referring now to FIG. **1**, a downhole system **100** is depicted which includes an embodiment of a wirelessly triggered hydrostatic set module **150**. The module **150** is provided in conjunction with a packer **175** which may be utilized in sealing and anchoring production tubing **110** at a downhole location (see FIG. **2**). Thus, the packer **175** is outfitted with sealing elements **177** which may be hydraulically set via a hydraulic line **160** running from the module **150**. In alternate embodiments, however, this line **160** may lead to hydraulically set devices other than packers.

**[0022]** As noted, the module **150** is wireless in nature. As shown in FIG. **1**, the module **150** is equipped with a wireless trigger mechanism **130**. With added reference to FIG. **2**, the trigger **130** is configured to detect a wireless communication from surface **200**. The communication may be in the form of a pressure pulse **201** or other signal emanating from surface **201** and transmitted downhole through the well **280**. Regardless, the trigger mechanism **130** is configured to actuate the hydrostatic set module **150** in response to the detection of the wireless signal.

**[0023]** With added reference to FIG. **2**, in an embodiment where pressure pulse **201** is employed, often referred to as e-firing, the trigger mechanism **130** may include a pressure sensor **480** as depicted in FIGS. **4**A and **4**B. In this embodiment a host of different signature types may be utilized in communicating with a processor **470** of the trigger mechanism **130** as described below. Further, given the downhole environment, a low pressure signature may be most suitable for communications. However, in other embodiments, the trigger mechanism **130** may be equipped with different types of sensors. For example, an acoustic sensor, flow meter or strain gauge may be utilized for respective detection of sonic transmission, fluid flow, or physical tension directed at the system **100** from the oilfield surface **200**. By the same token, a radio frequency identification (RFID) or pip tag detector may be utilized for detection of an RFID or radioactively marked projectile, respectively. Again, such a projectile may be dropped downhole from the oilfield surface **201** for activation of the trigger mechanism **130**, once detected by the sensor thereof.

**[0024]** Referring specifically now to FIG. **2**, an overview of an oilfield **201** accommodating a well **280** is shown. The above noted system **100**, with module **150** and packer **175**, is disposed within the well **280** providing isolation above a production region **287**. The well **280** is defined by a casing **285** traversing various formation layers **290**, **295** eventually reaching an uncased production region **287** with perforations **289** to encourage production therefrom. Although in certain embodiments, the production region **287** may be cased, for example with casing perforations also present. Regardless, a hydrocarbon production flow may ultimately be directed through production tubing **110** of the system **100** and diverted through a line **255** at the well head **250**.

**[0025]** A host of surface equipment **225** is disposed at the oilfield surface **200**. Indeed, a rig **230** is even provided to support additional equipment for well interventions or other applications beyond the packer setting described herein. As to packer setting, a control unit **260** is provided along with a pulse generator **265** to direct communications with the triggering mechanism **130** as described below. In the simplest form the pulse generator may be a pump. In other embodiments, however, alternate forms of wireless signal regulators may be employed as alluded to above.

**[0026]** Continuing with reference to FIG. **2**, the sealing elements **177** of the packer **175** are shown in an expanded state as directed by the hydrostatic set module **150** in response to actuation by the trigger mechanism **130**. As described above, the trigger mechanism **130** may be responsive to a wireless signal such as the noted pressure pulses **201**, thereby actuating the module **150** until the packer **175** is set. Indeed, as the packer **175** is set, wireless communication with the trigger mechanism **130** are eventually cut off. Of course, this only takes place once the trigger mechanism **130** and module **150** are no longer needed due to the completion of the setting application. The wireless communication signal may be sent through casing annulus as depicted between tubing **110** outside diameter and casing **285** inside diameter or alternately through the bore of the tubing **110** itself.

**[0027]** Referring now to FIG. **3**A, an enlarged view of the system **100** is shown taken from **3-3** of FIG. **2** with focus on the hydrostatic set module **150** and packer **175**. In this view, the packer **175** is not yet set by the module **150**. This is apparent as the sealing elements **177** of the packer **175** are shown in an undeployed state and displaying no sealing engagement with the casing **285** of the well **280**.

**[0028]** With added reference to FIG. **2**, the noted lack of sealing engagement means that wireless communications from the oilfield surface **200** may reach the trigger mechanism **130** of the module **150** for actuation. More specifically, the pulse generator **265** may be directed by the control unit **260** to transmit a particular signature of pressure pulses **201** downhole. These pulses **201** may be detected and evaluated by the pressure sensor **480** and processor **470** of the trigger mechanism **130**, respectively (see FIG. **4**A). Thus, once the proper signature is detected, the module **150** may be triggered as described above.

**[0029]** Referring now to FIG. **3**B, the system **100** is now shown with the packer **175** set following the above-noted activation of the module **150** by the trigger mechanism **130**. As shown, the sealing elements **177** are now in full sealing engagement with the well casing **285** and the pulses **201** apparent in FIG. **3**A have ceased. In an alternate embodiment the triggering mechanism **130** may be located uphole of the isolated location, perhaps along with the module **150** as well.

**[0030]** In addition to a packer setting application, other applications may take advantage of a wirelessly triggered hydrostatic set module **150**. For example, the module **150** with wireless triggering mechanism **130** may be utilized for shifting sliding sleeves. For example, this may be done to expose or close perforations **289** such as those shown in FIG. **2**. or for opening and/or closing of a circulating valve for displacement of fluids. Indeed, multiple modules **150** may be employed such that shifting open or closed may be undertaken, for example, depending upon the particular wireless signature employed by the regulator as directed by the control unit **260**. Similarly, a valve, such as a formation isolation valve, may be linked to wirelessly triggered hydrostatic set modules **150** for opening or closing thereof according to the techniques described hereinabove.

**[0031]** Referring now to FIG. **4**A, a schematic view of the system **100** detailed hereinabove is shown. In this view, particular attention is drawn to the inner workings of the trigger mechanism **130**. However, its hydraulic connection **420** to the hydrostatic set module **150** is also shown along with the hydraulic line **160** disposed between the module **150** and the packer **175** as referenced above. Indeed, as also noted above, production tubing **110** is centrally disposed relative to the overall system **100**. Further, the entire system **100** is disposed within a well **280** such as that of FIG. **2** which is defined by casing **285**. In the view of FIG. **4**A, illustration of the casing **285** is limited to portions located adjacent the packer **175**. However, the casing **285** defines a substantial majority of the well **280** as shown in FIG. **2**.

**[0032]** Continuing with reference to FIG. **4**A, the trigger mechanism **130** includes a sensor **480**. As detailed above, the sensor **480** may be a pressure sensor configured to detect pressure pulses directed from an oilfield surface **201** and/or pressure pulse generator **265**. However, as also noted, a variety of alternate sensor types may be utilized for detection of surface directed communications. These may include acoustic sensors, flow meters, strain gauges, and RFID or pip tag detectors, to name a few. In one embodiment, a pH or more chemical specific detector may even be employed for detection of an introduced fluid of a given characteristic. Such detectable fluid may even consist of the present wellbore fluid that is altered by the introduction of a pH altering or chemical presentation slug.

**[0033]** Regardless of the particular type of sensor **480**, its detection data may be acquired and interpreted by a processor **470** coupled thereto. Indeed, the processor **470** may immediately initiate triggering as described below upon detection of any surface directed communication. However, the processor **470** may also be programmed to initiate triggering upon the detection of a particular pattern or signature of surface communications. Thus, the odds of accidental triggering, for example, due to a false positive detection, may be reduced. Furthermore, the processor **470** may be employed to record and store data from the sensor **480** for later usage, perhaps unrelated to the triggering detailed below.

**[0034]** The processor **470** and any other electronics of the trigger mechanism **130** are powered by a conventional power source **460** such as an encapsulated lithium battery suitable for downhole use. More notably, however, the processor **470** is ultimately wired to a charge **400** that may be fired by the processor **470** as a means of triggering. In FIG. **4**A, the charge **400** remains unfired and isolated at one side of charge barrier **450**. However, upon direction by the processor **470**, the charge **400** is configured to break this bather **450** along with a chamber bather **440**, ultimately exposing a chamber **430** to wellbore pressure thereby actuating the hydrostatic set module **150** as described below.

**[0035]** Referring now to FIG. **4**B, a schematic view of the system **100** is shown in which the charge **400** of FIG. **4**A has been set off. Thus, the trigger of the trigger mechanism **130** has been pulled, so to speak. That is, based on analysis by the processor **470** of data obtained from the sensor **480**, the charge **400** of FIG. **4**A has been directed to go off, either upon being obtained or perhaps following a predetermined period of time. As noted above, this data obtained by the processor **470** relates to wireless surface communications detected by the sensor **480**.

**[0036]** Once the charge **400** goes off as noted above, the bathers **440**, **450** between the charge **400** and the chamber **430** of FIG. **4**A are eliminated. As a result, a port **480** between the chamber **430** and the wellbore is opened, thereby exposing the chamber **430** to wellbore pressures. Ultimately, through the hydraulic connection **420**, this leads to actuation of the setting mechanism **150** and hydraulic expansion of the packer **175** through the line **160**. Note, the schematically depicted sealing engagement between the packer **175** and the casing **285** which is depicted in FIG. **4**B.

**[0037]** The operation of the setting mechanism **150** as described above is that of an intensifier as would likely be the case for a conventional packer setting assembly. That is, aside from modifications for accommodating and coupling to the wireless trigger mechanism **130**, as described above, the setting mechanism **150** may otherwise be a conventional off-the-shelf hydrostatic set module, for example. Such a module is detailed in U.S. Pat. No. 7,562,712, Setting Tool for Hydraulically Actuated Devices, to Cho, et al., incorporated herein by reference in its entirety.

**[0038]** Referring now to FIG. **5**, an alternate embodiment of a wirelessly triggered HSM system **100** is shown in schematic form. In this embodiment, redundancy has been built into the system **100** with the addition of a second trigger mechanism **535**, a second hydraulic connection **520** to the HSM **150** and perhaps even a second line **560** therefrom to the packer **175**. This added redundancy may be employed to help ensure that complete triggering and packer setting takes place. For example, wireless communications through the wellbore may face interference challenges such as the presence of air in the case of pressure pulses **201** (see FIG. **2**). Nevertheless, the presence of multiple trigger mechanisms **130**, **530** increases the likelihood of wireless communication detection.

[0039] In one embodiment, wireless communications may take the form of different signature patterns, independently tailored to each of the mechanisms **130**, **530** to further increase the likelihood of processed detection. That is to say, the initial sensor **480** and processor **470** may be tuned to pick up a particular signature of wireless communications for analysis that differs from another signature geared toward the second sensor **580** and processor **575**. Thus, where the initial signature fails to fully propagate downhole to its respective sensor **480** and processor **470**, the other signature may nevertheless reach the second sensor **580** and processor **575** (or vice versa). Thus, another port **590** may be formed, chamber **530** exposed and the HSM **150** actuated.

[0040] Referring now to FIG. **6**, a flow-chart summarizing an embodiment of employing a wirelessly triggered hydrostatic set module is shown. As indicated at **615**, a downhole system may be deployed into a well. For embodiments detailed hereinabove, a production tubing system is described. However, other types of systems may utilize wirelessly triggered hydrostatic set modules, such as completion systems utilizing sliding sleeves. Regardless, once fully deployed, a variety of wireless communication signatures, such as pressure pulses, may be directed downhole as indicated at **635** and **655**. Thus, a sensor of a trigger mechanism incorporated into the system may detect downhole communications as indicated at **675**. Ultimately, therefore, a hydrostatic set module of the system may be triggered by the mechanism based on processing of the wireless detection (see **695**). This in turn may result in setting of a packer, shifting of a sliding sleeve or any number of downhole actuations as detailed herein.

[0041] Embodiments described hereinabove reduce the likelihood of having to remove and re-deploy an entire production string as a result of hydraulic strain induced on tubing due to packer setting. This is achieved in a manner that does not require the presence of a dedicated hydraulic line run from surface to the hydrostatic set module. As a result, concern over the introduction of new failure modes is eliminated. Furthermore, techniques detailed herein utilize wireless communications in conjunction with a hydrostatic set module that may be employed for a variety of applications beyond packer setting. Therefore, the value of the systems and techniques detailed herein may be appreciated across a variety of different downhole application settings.

[0042] The preceding description has been presented with reference to presently preferred embodiments. Persons skilled in the art and technology to which these embodiments pertain will appreciate that alterations and changes in the described structures and methods of operation may be practiced without meaningfully departing from the principle, and scope of these embodiments. For example, redundancy may be provided by providing an additional triggering mechanisms and HSM as noted hereinabove. However, redundancy for sake of ensuring triggering may also be provided to the system by programming each individual processor to recognize multiple different types of wireless communication signatures. Furthermore, the foregoing description should not be read as pertaining only to the precise structures described and shown in the accompanying drawings, but rather should be read as consistent with and as support for the following claims, which are to have their fullest and fairest scope.

I claim:

**1**. A downhole system for disposal in a well, the system comprising:

a hydraulically actuated downhole device;

a hydrostatic set module hydraulically coupled to said device for actuation thereof; and

a wirelessly responsive trigger mechanism coupled to said module and having a charge for activating said module for the actuation of said device.

**2**. The system of claim **1** wherein said mechanism further comprises a pressure chamber disposed adjacent the charge for exposure to wellbore pressure upon spending of the charge as directed by a processor of said mechanism, the exposure to provide the activating of said module.

**3**. The system of claim **1** wherein said hydraulically actuated downhole device is one of a packer, a sliding sleeve and a valve.

**4**. The system of claim **3** wherein the packer is a mechanical packer for securing production tubing at a location in the well.

**5**. The system of claim **3** wherein the valve is a formation isolation valve.

**6**. A wirelessly activated hydrostatic set module assembly for disposal in a well at an oilfield, the assembly comprising:

a hydrostatic set module for hydraulically actuating a downhole device in the well; and

a wireless trigger mechanism coupled to said module for initiating of the actuating, said mechanism having a sensor for detection of wireless communications and a processor for analysis thereof.

**7**. The assembly of claim **6** wherein the sensor is one of a pressure sensor, an acoustic sensor, a flow meter, a strain gauge, a radio frequency identification detector, a pip tag detector, and a chemical detector.

**8**. The assembly of claim **7** wherein the chemical detector is a pH detector.

**9**. The assembly of claim **7** wherein the pressure sensor is configured for detection of wireless communications in the form of pressure pulses propagated through the well from the oilfield.

**10**. The assembly of claim **9** wherein the pressure sensor and processor are configured to distinguish different signature patterns of pressure pulses from one another.

**11**. The assembly of claim **7** wherein the acoustic sensor is configured for detection of wireless communications in the form of sonic transmissions propagated through the well from the oilfield.

**12**. The assembly of claim **7** wherein the flow meter is configured for detection of wireless communications in the form of fluid flow directed from the oilfield.

**13**. The assembly of claim **7** wherein the strain gauge is configured for detection of wireless communications in the form of physical tension imparted on the assembly from the oilfield.

**14**. The assembly of claim **7** wherein the radio frequency identification detector is configured for detection of wireless communications in the form of a radio frequency identification tag fluidly transported through the well from the oilfield.

**15**. The assembly of claim **7** wherein the pip tag detector is configured for detection of wireless communications in the form of a radioactively marked pip tag fluidly transported through the well from the oilfield.

**16**. The assembly of claim **7** wherein the chemical detector is configured for detection of a chemical fluidly delivered through the well from the oilfield.

**17**. An oilfield assembly comprising:

a control unit disposed at an oilfield surface to direct wireless communications downhole into a well;

a wireless signal regulator coupled to said unit for disseminating the wireless communications into the well; and

a wirelessly activated hydrostatic set module disposed in the well, said module having a wirelessly actuated trigger for detection of the wireless communications and responsively activating said module to actuate a downhole device coupled thereto.

**18**. The assembly of claim **17** wherein the trigger is a first trigger, the assembly further comprising a second trigger of the module to increase the likelihood of the detection.

**19**. The assembly of claim **16** wherein each trigger is responsive to a different independently tailored signature pattern of the wireless communications.

**20**. A method of wirelessly actuating a downhole device from an oilfield surface, the method comprising:

deploying a downhole system into a well at the oilfield;

sending wireless communications downhole into the well from the oilfield surface;

detecting the communication with a sensor of a trigger mechanism of the system; and

actuating the device with a hydrostatic set module of the system based on analysis of the detected communication by a processor of the trigger mechanism.

**21**. The method of claim **20** wherein the wireless communications are pressure pulses generated by a pressure pulse generator located at the surface during said sending.

**22**. The method of claim **20** wherein the device is a packer, said actuating further comprising setting the packer.

**23**. The method of claim **20** wherein the device is a sliding sleeve, said actuating further comprising shifting the sliding sleeve.

**24**. The method of claim **20** wherein the device is a valve, said actuating further comprising changing a position of the valve.

**25**. The method of claim **20** wherein said sending comprises sending multiple wireless communication signatures downhole.

**26**. The method of claim **20** wherein the processor is programmed to recognize multiple wireless communication signatures.

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