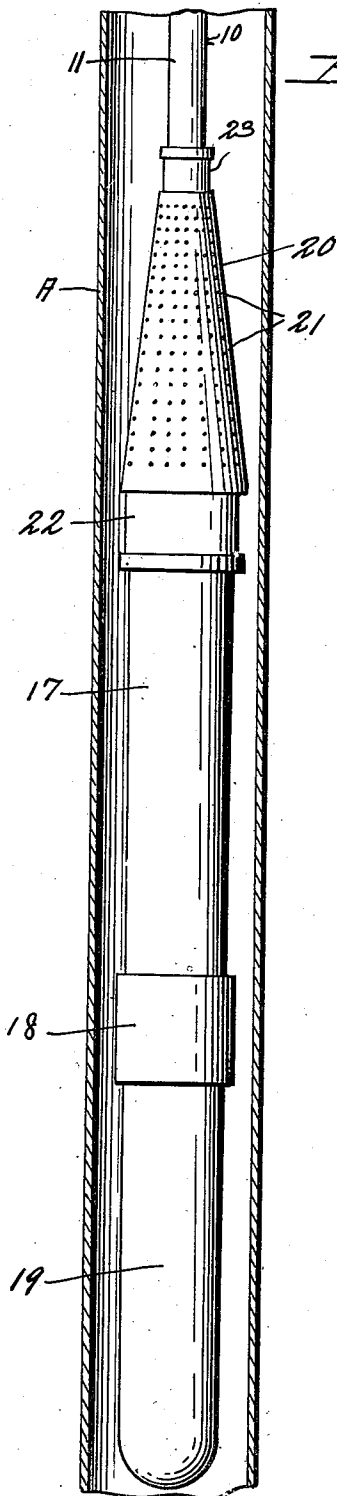
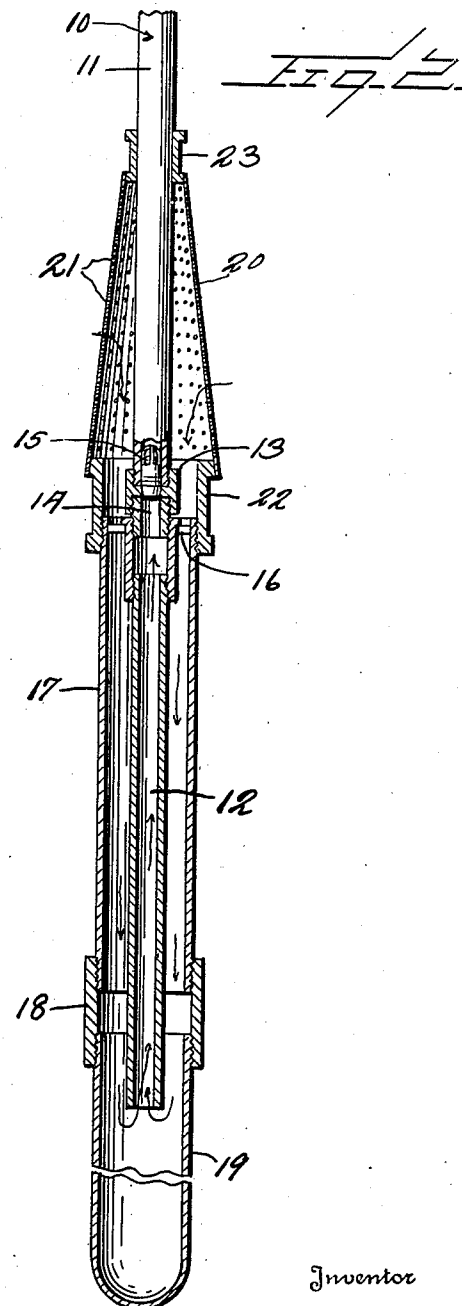


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SAND SEPARATOR

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UNITED STATES PATENT OFFICE

2,029,323

SAND SEPARATOR

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1 Claim. (Cl. 103—220)

This invention relates to oil wells and particularly to the gas anchors and sand separators thereof which are disposed beneath the pump and which are designed to separate the gas from the oil so that the gas will not enter the working barrel of the pump and which are also designed to cause the separation of the sand from the oil or other liquid entering the pump.

One of the objects of the present invention is to provide a gas anchor and sand separator in which a perforated upwardly conical head is used forming the upper end of a chamber surrounding the lower end of the working barrel and the standing valve, the conical element being perforated throughout its entire extent so as to permit the ready entrance of oil but prevent the entrance of trash, sand and other materials.

A further object is to provide a gas anchor and sand separator which will permit a relatively great flow of fluid at a decrease in power over what is necessary with the ordinary sand anchor.

A further object is to provide a gas anchor and separator which is less complicated and easy to manufacture than devices of the same character known to me and which can be made from lighter material, thus taking a considerable load off the tubing joints.

A further object is to provide a device of this character which will hold sand, gas and all trash such as swab rubbers outside of the anchor while at the same time permitting the tubing to be flooded with liquid.

Another object is to provide a device of this character in which practically no sand and no trash will gather in the container or chamber which forms the lower end of the tubing and which will thus not necessitate the pulling of the tubing in order to discharge the sand and other trash gathered within the container.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawing, wherein:—

Figure 1 is an elevation of my sand separator and oil anchor, the tubing of the well being shown in section;

Figure 2 is a vertical sectional view of the sand separator and anchor.

Referring to the drawing, 10 designates the working barrel which, as illustrated, is formed of pipe sections 11 and 12. The pipe section 11, as illustrated, is connected by a coupling 13 to a nipple 14. The working barrel section 11 carries the standing valve 15. Nipple 14 screws into a

spider 16 with which the pipe section 12 engages by screw-threads.

The spider 16 is cast with the upper end of a relatively large pipe section 17. This is adapted to be connected by a coupling 18 to a lower section 19 which is preferably rounded at its lower end or has a hemispherical lower end, this lower end being, of course, closed. The sections 19 and 17 with the coupling 18 constitute a container into which the pipe section 12 extends. Surrounding the pipe section 11 is a conical strainer 20 constituting a head for the upper end of the container 19. This is finely perforated with apertures 21. At its lower end, this conical strainer terminates in a collar 22 adapted to have screw-threaded engagement with the upper section 17 of the container and at its upper end the head 20 terminates in a collar 23 which loosely surrounds the pipe section 11. The casing of the well is designated A.

In actual practice, the oil within the casing A passes through the fine perforations 21, flows downward within the container 19 to the lower end of the pipe section 12 and as the pumping operation proceeds is drawn upward past the standing valve in the usual manner. The object in making the screen 20 in the form of a downwardly and outwardly sloping cone is to prevent its hanging on the casing when pulling the tubing. The container 19, it will be understood, is full of dead liquid. The perforations of the screen hold all the sand and gas from entering the container formed of the sections 17 and 19 and thus prevent the sand and gas from interfering with the proper operation of the standing valve.

Inasmuch as the container is filled with dead liquid, it is obvious that gas cannot back down through this body of dead liquid and then up through the pipe section 12 but this gas will be forced outward between the casing and the tubing A.

The screen 20 will hold out all trash and sand and thus eliminate the wear and tear on the valves and seats.

In other constructions of this character known to me, sand, trash and oil pass into the lower end of the anchor altogether and sand will collect in the bottom of the anchor, thus causing it to fill up shortly and the sand and other trash will pass up through the valves in the working barrel or else it will be necessary to pull the tubing at relatively short intervals in order to dump the material gathered within the anchor. My

device keeps this foreign material out before it gets inside of the anchor.

The structure is very simple and can be cheaply made. It is easy to take apart and assemble and can be made to fit any size of tubing and use any size or style of standing valve or working barrel.

Attention is called to the use in my device of the short nipple 14 that screws directly into the hub or seat of the standing valve. With my structure, the working barrel can be screwed directly on to the standing valve by not using this nipple 14 and the coupling 13 or if the working barrel is used, already formed with a standing valve and seat, then this working barrel may be screwed on to the short nipple 14.

From my experience with this device and other devices known to me, I believe a well will pump 20% more liquid using 20% less power than with other gas anchors at present in use. This is due to the fact that the ordinary gas anchor will not let the liquid flow freely to the valves. The area of the perforated cone 20 is such as to permit free flow of liquid into the container and this liquid flows freely upward through the valves of the pump.

While I have illustrated certain details of construction and arrangement of parts, I do not wish to be limited thereto as obviously many

changes might be made therein without departing from the spirit of the invention as defined in the appended claim.

Thus I do not wish to be limited to the particular form of the standing valve illustrated nor its means of connection at this point as the location and the mounting of the standing valve may be changed in many ways without departing from my invention as defined in the claim.

I claim:—

A gas anchor and sand separator comprising a container closed at its lower end, the upper end of the container having a spider formed with a central internally screw-threaded hub, a finely perforated head having a collar at its lower end for engagement with the upper end of the container, the hub being upwardly and inwardly conical and terminating in a collar adapted to fit around a working barrel, a working barrel extending thru the small upper end of the head, a collar on the lower end of the working barrel, a nipple engaged with the collar and with the interior screw threads of the hub, and a pipe section engaged with the hub below the nipple and extending downward into the container, the pipe section being open at its lower end and terminating short of the lower end of the container.

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