April 11, 1967 J. D. TENNISON, JR., ETAL 3,313,352

WELL CASING PROTECTIVE SKIRT

Filed April 6, 1964

Fig. 1

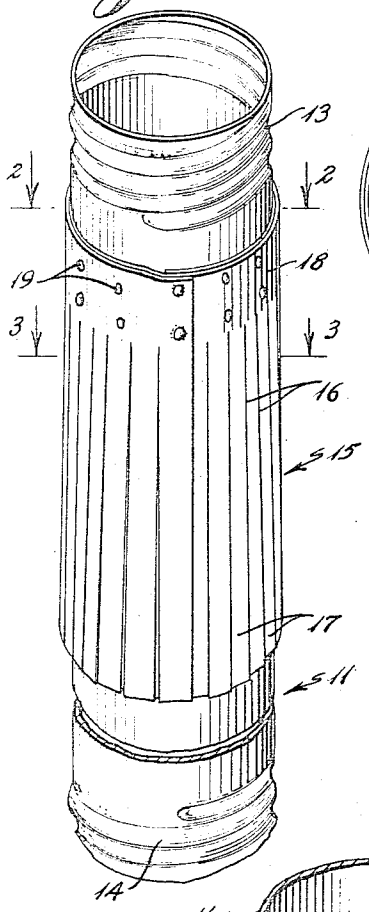


Fig. 2

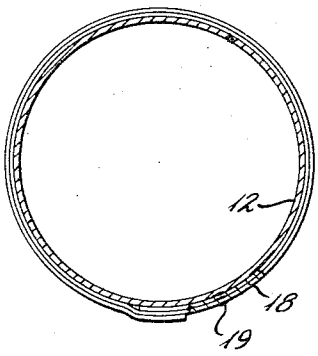


Fig. 3

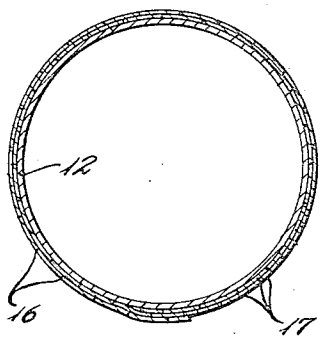


Fig. 5

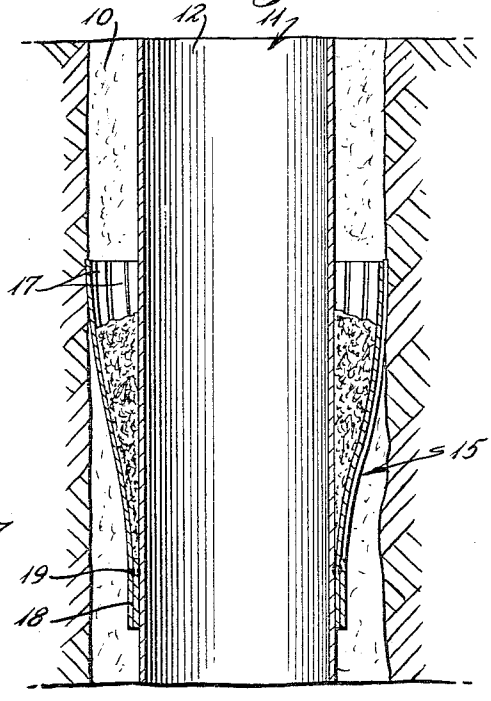
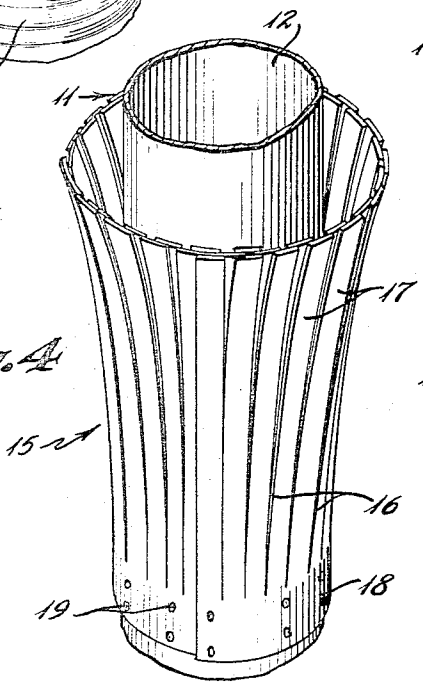


Fig. 4



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WELL CASING PROTECTIVE SKIRT

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1 Claim. (Cl. 166—202)

This invention relates to subterranean deposits, to the obtaining of access thereto, including wells, to the removal of fluid from beneath the surface of the earth, and to apparatus and equipment by which the supply of such fluids is preserved and removed.

The invention relates particularly to well casings located in bore holes and extending downwardly below the surface of the earth to fluid-bearing strata and to apparatus connected to such casings for protecting the fluid-bearing matter from that which does not yield fluid.

Heretofore when fluids were to be removed from beneath the surface of the earth a well or bore hole was customarily drilled through various layers of non-fluid bearing material until a fluid bearing strata was reached. When the desired fluid was water it was necessary at times to penetrate several layers of water bearing sand until water of sufficient purity for human consumption and of sufficient flow to satisfy the demands was reached. A casing was applied to the bore hole simultaneously with the drilling operation or subsequent thereto to provide a lining for, and to prevent dirt and sand from caving in and filling the hole. The hole normally was of a larger diameter than the casing so that the casing could be quickly and easily applied and frequently wells have been ruined or rendered inoperative when dirt or other non-water bearing material caved in and dropped by gravity in the space between the casing and the walls of the hole. The dirt fowled the water bearing sand and resulted in complete stoppage of the flow of water or muddy unusable water.

It is an object of the invention to provide a wall casing and a protective shield or skirt connected to and about the lower end of the well casing so that it will be located adjacent to the bottom of the bore hole in a manner that portions of the skirt will extend outwardly from the casing into engagment with the walls of the bore hole and provide a shield to prevent the passage of material past the same.

Another object of the invention is to provide a protective shield or skirt for attachment to the lower end portion of the well casing, such skirt including a series of layers of flexible fingers in overlapping relation to form substantially a solid barrier against the passage of material.

A further object is to provide a guard forming skirt connected to a well casing in which the skirt is disposed collapsed adjacent to the casing for ease of transportation and which has portions movable outwardly of said casing when applied to a bore hole.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing in which:

FIG. 1 is a perspective of a section of well casing with a skirt attached thereto in position for storing or transporting;

FIG. 2, an enlarged section taken along the line 2—2 of FIG. 1;

FIG. 3, an enlarged section taken along the line 3—3 of FIG. 1;

FIG. 4, a perspective illustrating the skirt in a position to be inserted in a hole; and,

FIG. 5, a vertical section illustrating one use of the device.

Briefly stated the present invention is a guard forming skirt which can be attached to a well casing adjacent to the lower end thereof and such skirt may be located in close proximity to the casing when not in use and can be expanded into engagement with the sides of the well when in use to prevent non-fluid bearing material from falling into the fluid bearing material.

With continued reference to the drawing a bore hole or well **10** is drilled into the earth through non-water bearing strata until a layer of water bearing sand of sufficient purity and volume of flow is reached. A well casing **11** is then inserted in the hole and such casing includes a plurality of sections **12** which normally are approximately ten feet or other convenient handling length. The sections may be joined together in any desired manner, as by providing male threads **13** on one end of each of the casings and corresponding female threads **14** on the opposite end and threadingly connecting the sections as they are inserted in the bore hole or well **10**. The sections extend from a conventional filter member (not shown) disposed in the water bearing layer of sand upwardly through the hole to a position above the surface of the earth where it is either capped or connected to a conventional pump.

The side walls of the bore hole sometimes cave in and fall by gravity between the walls of the hole and the outside of the casing and such dirt, rocks and other non-fluid bearing material fall into the water bearing sand and cause the water therein to be muddy and otherwise impure and unusable.

In order to prevent the non-water bearing material from falling into the water bearing material, a guard forming skirt **15** is attached to the casing **11** adjacent to the lowermost end thereof. The skirt is constructed of a relatively long strip of flexible sheet metal or other sheet material of a length to wrap around the circumference of the casing at least twice. The skirt is formed by cutting a plurality of relatively closely spaced slots **16** from one edge of the skirt and terminating a short distance from the remote edge thereof. The cutting of the slots forms a plurality of relatively narrow fingers **17** connected at one end by a continuous band **18**. The skirt is wrapped around the casing to form at least two overlapping layers of fingers after which the skirt is attached to the casing in any desired manner, as by spot welds **19** connecting the band **18** to the casing **11**.

The fingers **17** are located in close proximity to the well casing **11** when in storage or during transit and when the casing is to be placed in the bore hole or well **10** the fingers are bent slightly at the connection with the band **18** and caused to fan out as illustrated in FIG. 4. When the casing is inserted in the hole the fingers press outwardly into engagement with the side walls of the hole and as the casing is forced down through the well the inherent flexibility of the fingers will maintain such fingers in contact with the side walls.

Since there are at least two layers of overlapping fingers, the fingers of one layer will substantially fill the spaces between the fingers of the second layer and will form substantially a solid barrier so that any material falling from above will be caught between the skirt and the casing and cannot fall into the water bearing sand or other material. If desired the casing **11** may be withdrawn slightly after it has been inserted all the way to the bottom of the hole so that the free ends of the fingers will bite into the side walls of the hole and provide a permanent anchor as well as a barrier.

It will be apparent that a relatively simple protective skirt has been provided which can be attached to a well casing adjacent to the lower end thereof and which can be expanded outwardly to engage the side walls of a hole and provide substantially a solid barrier against the passage of material from above.

It will be obvious to one skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claim.

What is claimed is:

A guard-forming skirt for application about the lower end of a well casing for preventing matter from falling below said skirt in a well, said skirt comprising a relatively long flexible sheet of a length to wrap at least twice around the well casing to which it is to be applied and providing a corresponding number of layers, said sheet having a continuous portion with a plurality of relatively narrow finger-forming strips connected at one end thereto, and, when in operative position, providing overlapping layers of such fingers, said fingers being of a character to be compactingly disposed during storage and transit, and to be spread out when the device is in use.

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