

Feb. 10, 1959

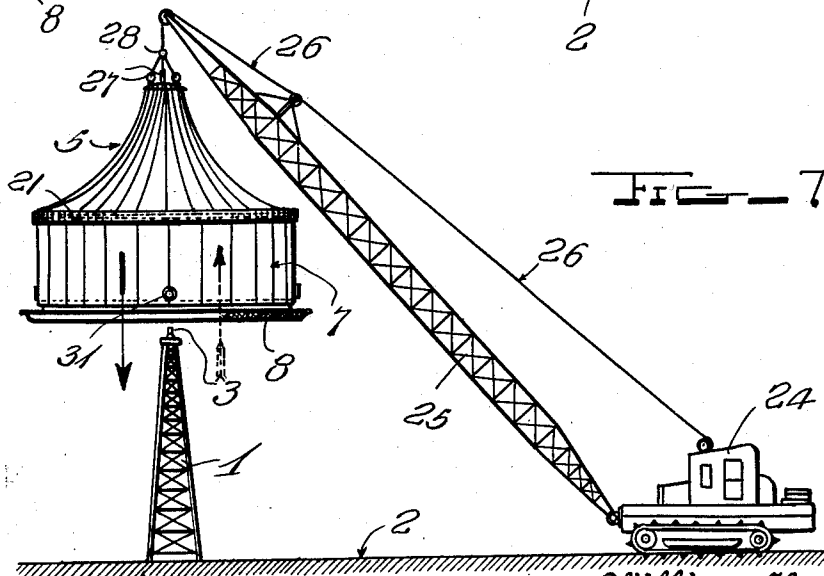
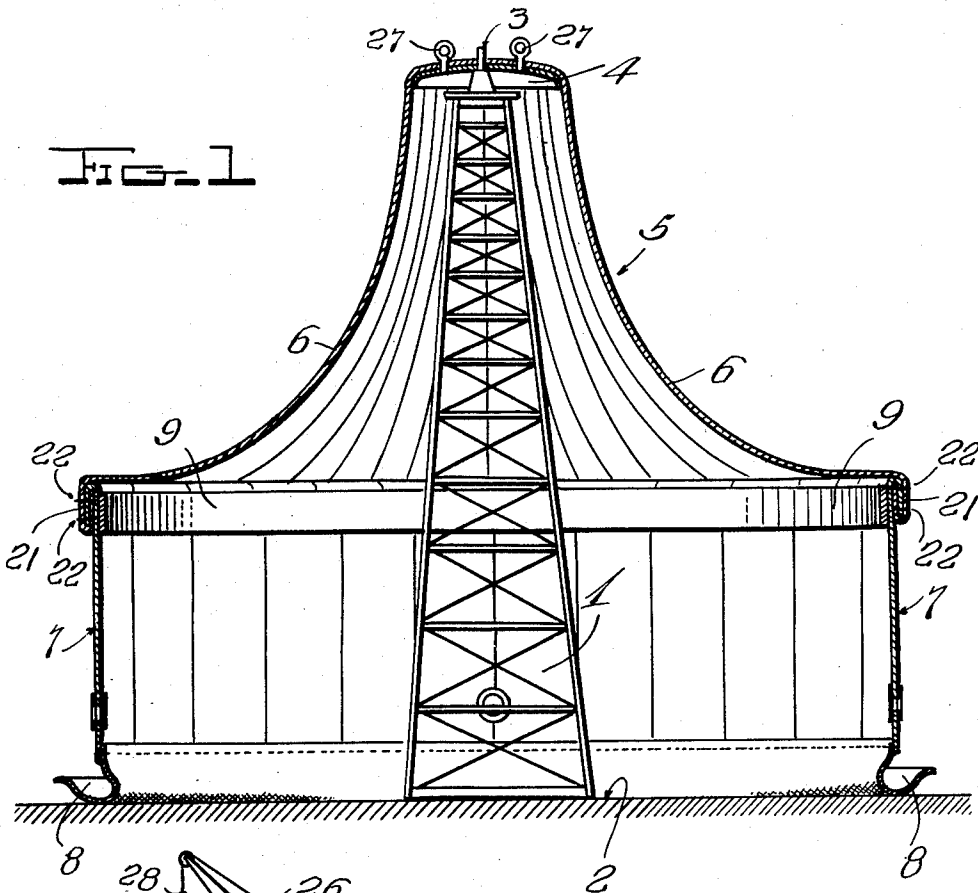
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2,872,933

AIR-INFLATED DRILLING RIG COVER.

Filed Aug. 5, 1957

3 Sheets-Sheet 1



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FIG. 2

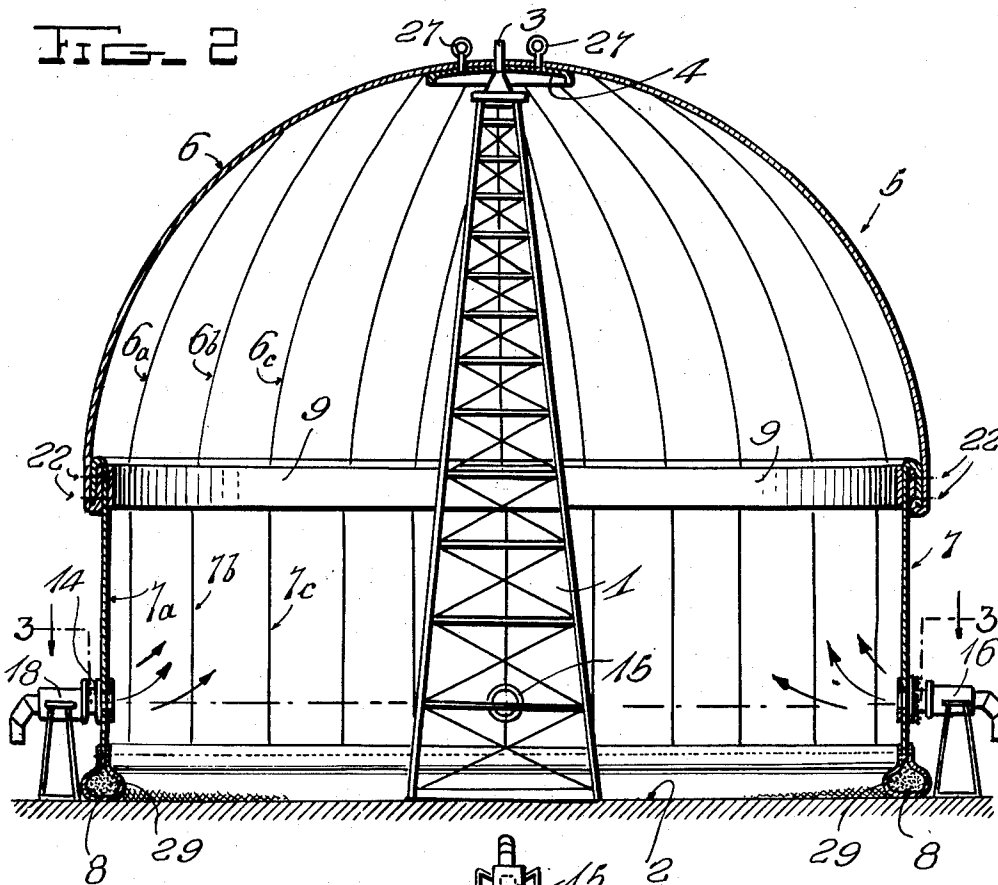
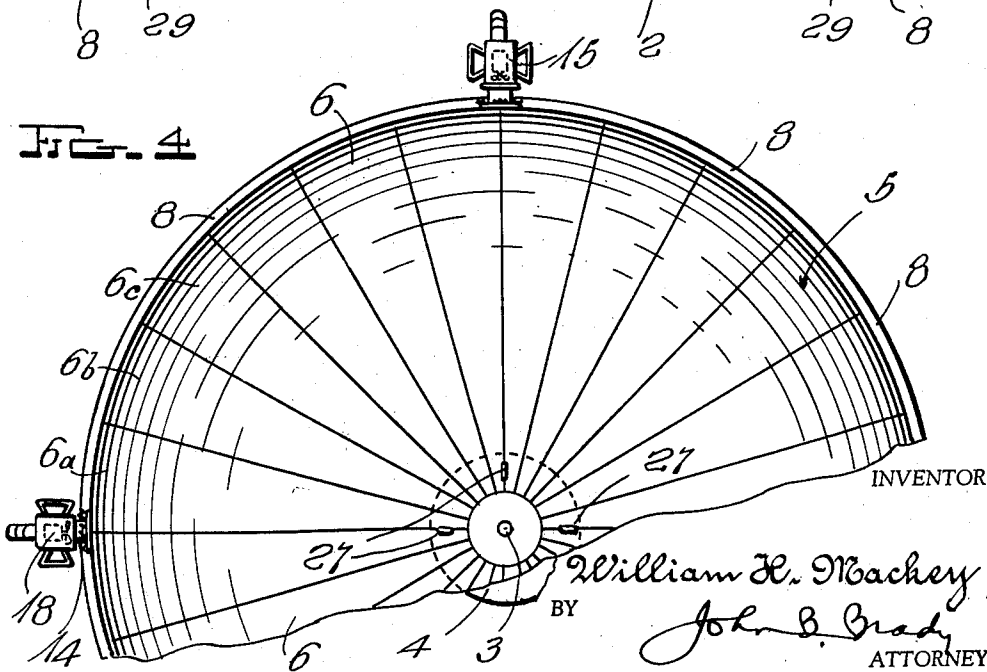


FIG. 4



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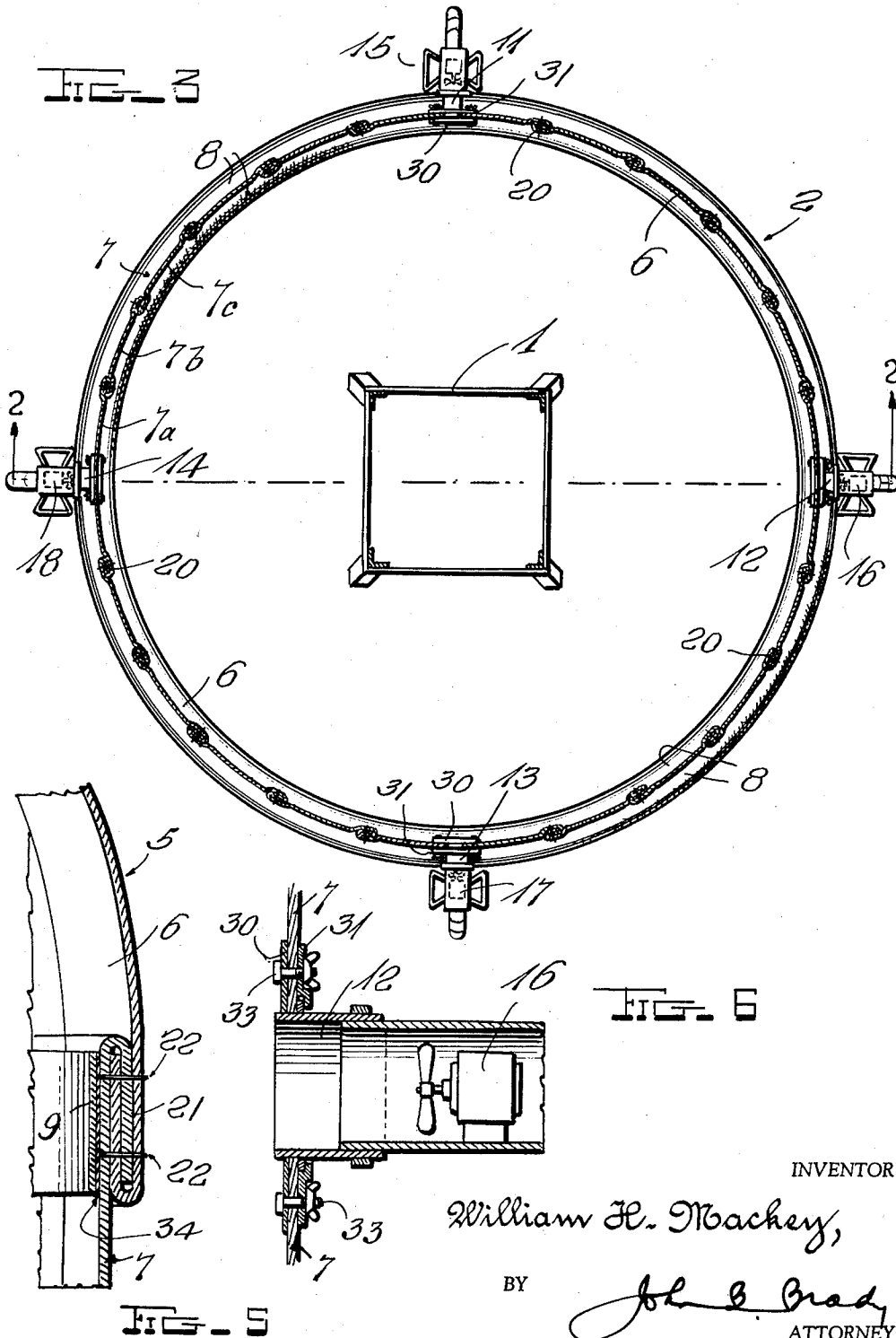
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3 Sheets-Sheet 3



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AIR-INFLATED DRILLING RIG COVER

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Application August 5, 1957, Serial No. 676,271

3 Claims. (Cl. 135—1)

My invention relates broadly to oil drilling rigs and more particularly to a protective housing for oil drilling rigs.

One of the objects of my invention is to provide a construction of protective housing for oil drilling rigs enabling operation to be carried on continuously at the oil drilling rig independently of conditions of weather or temperature or the forced spraying of oil from parts of the oil drilling system.

Another object of my invention is to provide a construction of inflatable enclosure for an oil drilling rig which may be maintained in erect position around the oil rig by the continuous pumping of air into the interior of the cover for conditioning the atmosphere around the rig and maintaining proper working conditions around the oil drilling rig independently of the leakage of oil and gas prevalent around an oil well.

Still another object of my invention is to provide a construction of inflatable cover for an oil drilling rig which may be readily suspended from the top of the drilling rig and provided with an intermediate brace disposed between the top and bottom of the cover wherein the cover is maintained in inflated position around the oil well rig by one or more blowers for continuously supplying streams of air into the interior of the cover for maintaining the cover in an inflated erect position around the oil well drilling rig.

Other and further objects of my invention reside in an arrangement of stabilizer connecting cap for the cover of an oil well drilling rig and an arrangement of expander band for the drilling rig cover and an associated base seal enabling the cover to be maintained in an erect inflated position around an oil well rig by means of a continuous supply of air from pressure blower means connected with the interior of the cover as set forth more fully in the specification hereinafter following by reference to the accompanying drawings, in which:

Fig. 1 is a vertical sectional view showing a typical oil well rig with the protective cover of my invention as initially applied thereto and shown in a deflated condition and with the ballast seal open just prior to the conditioning of the cover for the operation of the blower equipment for inflating the cover around the oil well drilling rig;

Fig. 2 shows the arrangement of the cover of my invention with respect to the oil well drilling rig where the ballast seal is filled and the cover is inflated to an expanded position for protection of the drilling rig and the working area surrounding the rig, the view being taken substantially on line 2—2 of Fig. 3;

Fig. 3 is a transverse sectional view taken substantially on line 3—3 of Fig. 2 and illustrating the layout of the multiplicity of blowers which I employ for supplying air continuously to the interior of the protective cover around the oil well drilling rig;

Fig. 4 is a fragmentary plan view looking down on the top of the inflated structure of Fig. 3;

Fig. 5 is an enlarged cross sectional view of the drilling

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rig cover showing the connection between the bottom cylindrical section and the top dome-shaped section thereof and indicating particularly the arrangement of the expander band intermediate the top and bottom of the cover;

Fig. 6 is a fragmentary longitudinal sectional view through one of the blower tubes for inflating the drilling rig cover and showing particularly the detachable connection between the cover and the blower tube; and

Fig. 7 is a schematic view illustrating one method of erecting or installing the drilling rig cover in deflated condition with respect to the drilling rig.

My invention is directed to an inflatable cover for housing a drilling tower for an oil well drilling rig to enable operations to be carried on independently of prevailing temperature and weather conditions and to protect the oil well equipment and those at work on the rig. The cover of my invention is particularly applicable to offshore drilling rigs where an attack from salt spray results in corrosion and deterioration of the parts of the equipment. The protective cover of my invention provides means for maintaining the continuity of operations around the oil well drilling rig regardless of changes in weather and temperature and serves as a protective means against detrimental sprays from adjacent oil well operations which often produce such gumming and congealing of foreign matter around the oil well drilling equipment as to make frequent cleaning and maintenance essential. The cover of my invention is constructed according to the principles set forth in my co-pending application Serial No. 670,996 filed July 10, 1957, for air-inflated building structures. I utilize an airtight fabric which is impervious to moisture as the enclosing material. I employ various kinds of airtight materials such as vinyl-coated nylon fabric of great strength that withstands both extreme warm and cold temperatures, or a laminated fabric in lieu of the coated fabric may be used. The material is weather proof and airtight and has a life expectancy sufficient to perform all of the functions intended by the instant invention. The flexible fabric of my invention in the instant case, however, is formed by seamed strips contoured in the form of a dome or an igloo which is provided at the top with a stabilizer cap adapted to be centered upon and fitted over the top of the oil well drilling rig hoisting pole. This stabilizer cap is cemented to the fabric of the cover forming a substantially airtight connection supportable at the top of the oil well drilling rig. At approximately the base of the dome or the igloo shaped portion of the cover I provide an expander band forming a peripheral belt disposed vertically in the wall of the cover and forming means for shaping the cover substantially midway of the height of the drilling rig. The lower portion of the cover extending below the expander band is substantially cylindrical, disposed on a vertical axis. This lower portion of the cover terminates in a ballast tube which forms a seal with the surface around the drilling rig. Where this surface is irregular such as the ground around the drilling rig, the ballast tube makes an ideal seal with respect to the surface of the earth by virtue of the conformance of the ballast tube with the irregular surface of the earth as explained more fully in my aforesaid co-pending application. Where the drilling rig is associated with the deck of a barge, the ballast tube insures a tight seal therewith. For purposes of conditioning the atmosphere about the drilling rig equipment and also inflating the drilling rig cover I provide a multiplicity of blowers arranged to continuously deliver streams of air to the interior of the cover around the oil drilling rig. Where the base of the cover, that is the portion which surrounds the base of the oil drilling rig, has a diameter of the order of 90 feet and where the height of the cover is of the order of 75 feet I find it de-

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sirable to employ four continuously driven blowers located in opposite diametrical positions and capable of supplying quantities of air at the rate of 5000 cubic feet per minute with the blowers operating simultaneously and continuously.

Referring to the drawings in more detail reference character 1 designates an oil well drilling rig erected on the surface 2 and terminating at its top in the hoisting pole indicated at 3. Such oil well drilling rig may have a height of approximately 75 feet and the area reserved for operations about the oil well equipment may have a diameter of approximately 90 feet. It is in this area that I erect the protective cover of my invention which consists of the stabilizer cap 4 which is centered over the hoisting pole 3 as represented in Fig. 1. The material constituting the cover is shown at 5 and may be as heretofore explained vinyl-coated nylon fabric of great strength that withstands both extreme warm and cold temperatures or a laminated fabric in lieu of the coated fabric may be used. The material is waterproof and airtight and will withstand the pressure of sprays directed against the surface of the material when the building structure constituted by the material is in inflated condition. The upper portion of the cover is formed by strips of the flexible material seamed and stitched to provide airtight seams and to form a substantially semi-spherical dome or igloo-shaped top indicated at 6 in Fig. 2. The lower portion of the cover 5 is shaped to constitute a vertically extending extremity of the flexible wall 7 and terminating in the ballast tube 8 as explained more fully in my aforesaid co-pending application. The ballast tube 8 forms a seal against the surface 2. Intermediate the cylindrical portion 7 and the dome-shaped portion 6 of the cover 5 I provide an expander band 9 which is suitably attached to the interior of the surface of the material of cover 5. The band 9 is formed from aluminum and is extremely light in weight but is quite rigid in its vertical section and provides adequate reinforcement for the material 5 intermediate the cylindrical section 7 and the dome-shaped section 6. I preferably cement the expander band interiorly of the material 5 forming a division between the dome-shaped portion 7 and the cylindrical portion 7 of the cover at which position the strips forming the taped sections indicated at 6a, 6b, 6c, etc. are seamed to the upper ends of the vertically extending strips 7a, 7b, 7c, etc. of the cylindrical section 7 of the cover.

In order to maintain the cover in inflated condition around the oil well drilling rig, I position air delivery tubes in the side wall of the cylindrical portion 7 of the cover as represented at 11, 12, 13 and 14 connected to motor driven fan blower units represented at 15, 16, 17 and 18. These fan blower units supply air to the interior area of the cover at the rate of approximately 5000 cubic feet per minute which is adequate to maintain the cover 5 in inflated condition about the oil drilling rig taking into account leakage which is bound to occur at certain of the seams, such as 20 or 21, between the seal 8 and the surface 2; and around the hoisting pole 3 at the top of the oil drilling rig. The seam 21 is stitched at 22 and is cemented or glued to the expander band 9 as represented by the layer of adhesive at 34. This joint serves to so stiffen the connection between the dome-shaped section 6 and the cylindrical section 7 that installation of the cover over an oil rig or removal of the cover for installation on another oil rig is considerably simplified. In Fig. 7 I have illustrated one method of installing or removing the cover with respect to the oil rig. A relatively light crane 24 may be used having a boom 25 over which the cable system 26 runs for suspending the stabilizer cap 4 with the cover 5 connected thereto. The stabilizer cap 4 is provided with certain eyelet connectors 27 through which equalizer cables in the form of a sling extend and are symmetrically connected to the end of the cable system 26 through eye 28. Operation of crane 24 provides a simple means for effect-

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ing and removing the drilling rig cover, but other methods may be employed. The drilling rig cover is sufficiently light in weight to enable the stabilizing cap 4 to be maneuvered into position over the hoisting pole 3 by working from within the cover on the rig 1. When the cover is initially placed in position the ballast tube 8 is completely open as represented in Figs. 1 and 7 so that the cover is not subjected to the mass provided by the weight of the ballast tube. When the cover is maneuvered into position the ballast tube 8 is filled with sand or sand bags represented at 29 in Fig. 2 and the ballast tube closed for sealing the cover against the surface 2.

In Fig. 6 I have represented the blower unit 16 in association with the air delivery tube 12. The air delivery tube 12 is detachably connected to the dome-shaped section 6 through an arrangement of annular sealing rings 30 and 31 which clamp the material of the cylindrical portion 7 of the cover and maintain such cylindrical portion in tight engagement with the annularly extending flange 32 of the air delivery tube 12. Detachable clamping bolts 33 secure the cylindrical wall 7 of the cover with respect to the blower tube 12 by the clamped joint between the material of the cylindrical portion 7 of the cover, the rings 30 and 31 and flange 32 of the blower tube 12.

Under certain conditions of weather and outside atmospheric temperature it may be necessary to condition the air before it is pumped into the interior of the cover by utilizing the principles set forth in my copending application Serial Number 670,934, filed July 10, 1957, for Air-Inflated Roof Structure for facilitating the continuous work of personnel on the oil drilling rig regardless of weather conditions.

Upon conclusion of operations on one drilling rig the cover and blower equipment of my invention is readily removable and is portable in character so that it may be readily installed on another drilling rig for continued operation.

While I have described my invention in certain of its preferred embodiments I realize that modifications may be made and I desire that it be understood that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. An air-inflated drilling rig cover comprising a cover material substantially impervious to air and moisture and having a substantially circular contour terminating in a seal adapted to establish substantially air-tight sealing connections with the surface surrounding an oil well drilling rig adapted to be protected by said material, means for dividing said cover material into a dome-shaped section and a cylindrical section and means for continuously supplying air under pressure through said cylindrical section for inflating both of said sections in a position around the oil well drilling rig, wherein the dome-shaped section of said cover material has a stabilizer cap cemented to the center of said material, said stabilizer cap including means for effecting connection with the top of the oil well drilling rig for distributing the cover material uniformly around the rig.

2. An air-inflated drilling rig cover comprising a cover material substantially impervious to air and moisture and having a substantially circular contour terminating in a seal adapted to establish substantially air-tight sealing connections with the surface surrounding an oil well drilling rig adapted to be protected by said material, means for dividing said cover material into a dome-shaped section and a cylindrical section and means for continuously supplying air under pressure through said cylindrical section for inflating both of said sections in a position around the oil well drilling rig, wherein the means for dividing said cover material into a dome-shaped section and a cylindrical section includes a vertically extending

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belt of metallic material fastened to the interior of both of said sections.

3. An air-inflated drilling rig cover comprising a cover material substantially impervious to air and moisture and having a substantially circular contour terminating in a seal adapted to establish substantially air-tight sealing connections with the surface surrounding an oil well drilling rig adapted to be protected by said material, means for dividing said cover material into a dome-shaped section and a cylindrical section and means for continuously supplying air under pressure through said cylindrical section for inflating both of said sections in a position around the oil well drilling rig, wherein said means for dividing said cover material into a dome-shaped section

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and a cylindrical section includes a vertically extending belt of material which is substantially rigid and conforms with the surface of said cover material, and means for fastening said belt to the interior of both of said sections.

References Cited in the file of this patent

UNITED STATES PATENTS

214,996	Doane -----	May 6, 1879
468,455	Giessmann -----	Feb. 9, 1892
2,649,101	Suits -----	Aug. 18, 1953
2,652,845	O'Neill et al. -----	Sept. 22, 1953
2,753,818	Green -----	July 10, 1956
2,804,951	Kolt -----	Sept. 3, 1957