May 14, 1929. C. E. WOOD 1,712,803

FLOAT DRILL PIPE

Filed Feb. 23, 1927

Fig. 1.

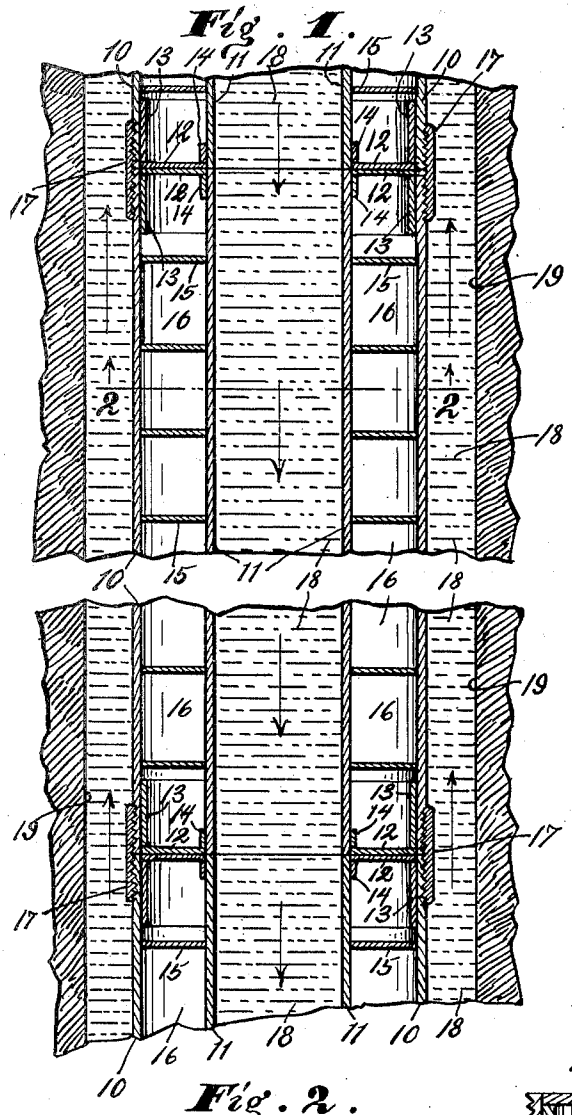


Fig. 3.

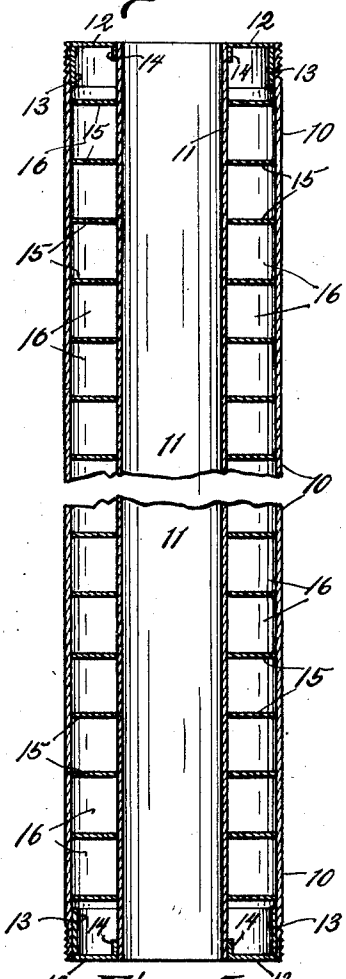


Fig. 2.

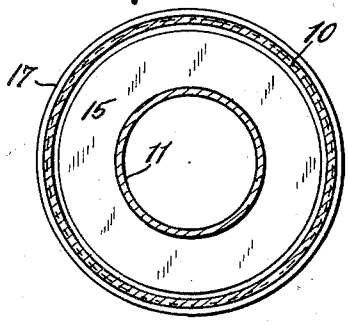
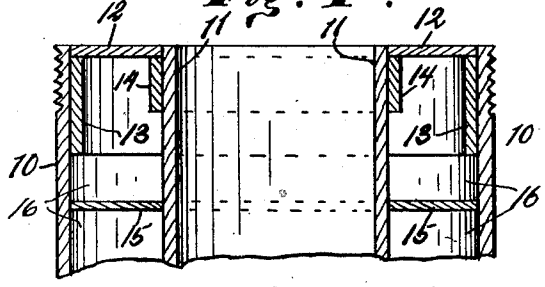


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES EDWARD WOOD, OF LOS ANGELES, CALIFORNIA.

FLOAT DRILL PIPE.

Application filed February 23, 1927. Serial No. 170,254.

This invention relates to drill pipes for drilling deep wells, and an object of the invention is to provide a drill pipe that is strong and durable, and not liable to twist, bend or buckle when in use.

To that end I provide outer and inner cylinders that are secured together in such a way as to be reinforced against external and internal pressure, as well as twisting, so that the drill pipe cannot be easily bent, buckled or broken.

Another object of the invention is to provide a drill pipe that is buoyant while in use. In other words air chambers are provided between the outer and inner cylinders so that when the drill is extended down into mud, such as is used in oil well work, the pipe will be buoyant and, in a large measure, support the great weight of the drill pipe.

As is well understood in the art, drill pipes in deep wells are of very great length and weight, many of them exceeding four thousand feet in length and forty and fifty tons in weight, and an object of the invention is to reduce the weight of the pipe by buoyancy, so that it can be easily handled and supported, and also so that a drill of substantially the same diameter can be used to drill to indefinite depths. Heretofore it has been customary to reduce the size of the drill pipe after reaching great depths in order to reduce the weight of the drill pipe; and an object of this invention is to provide a drill pipe that can be of substantially the same diameter throughout the well excavating operation, as by my buoyant means I support the pipe so that the weight becomes a nominal factor in well drilling. It is understood that I may use a drill pipe of any desired diameter.

Another object of the invention is to construct the drill pipe in sections of various lengths and sizes so that they can be adopted in general use in oil well drilling. In other words each section is a complete unit with inner and outer cylinders of substantially the same length so that it can abut end to end with other units of like structure and diameter and be connected by ordinary pipe couplings.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

The accompanying drawings illustrate the invention:

Figure 1 is a fragmental section of the drill pipe in use in a deep well. Fig. 2 is a cross section on the line 2—2 of Fig. 1. Fig. 3 is a broken central vertical section through one of the drill pipe units. Fig. 4 is a fragmental view of one end of a drill pipe unit showing in detail the means for reinforcing the ends of the inner and outer cylinders so as to form seats for the end plates so they can be supported in proper position while being welded flush with the ends of the cylinders.

A unit of the floating drill pipe is shown in Fig. 3 and it comprises an outside cylinder 10 and an inside cylinder 11 of substantially the same length, and the cylinders of each unit have adjacent ends secured together by end plates 12 which are brazed or welded to the inner wall of the outer cylinder and outside wall of the inner cylinder; but before these plates are secured in place ring bands 13 are welded to the inner wall of the cylinder 10 adjacent its ends, and other ring bands 14 are welded to the outer wall of the cylinder 11 adjacent its ends to form seats for the plates 12 to facilitate welding them to the cylinders and so they will lie flush with the ends of the cylinders. The plates 12 are arranged so that they hold the inner cylinder 11 exactly central to the longitudinal axis of the cylinder 10.

Before the plates 12 and bands 13, 14 are secured to the cylinders disks 15 are secured to the outer wall of the inner cylinder 11, and they are constructed so they fit snugly to the inner wall of the cylinder 10, and they are are spaced at equal distances apart on the cylinder 11 and are secured thereto either by brazing or welding, and this is done before the cylinder 11 is inserted in the cylinder 10. After the disks 15 are secured to the cylinder 11 and inserted in the outer cylinder 10, the end plates 12 and ring bands 13, 14 are secured in place, as previously stated, to make an air-tight closure to the space between the cylinders.

By means of the end plates 12 and ring bands 13, 14 welded to the ends of the cylinders 10 and 11 I provide a very strong reinforcing to the threaded ends of the cylinder 10 that will prevent them from easily breaking while in use.

The disks 15 are spaced apart on the cylin-

der 11 so as to form a large number of air chambers 16; and also these disks function to reinforce the cylinders so that they are not easily bent or broken in use and so they will resist great external and internal pressure.

If desired the outer edges of the disk 15 can be secured to the inner wall of the shell 10 by brazing or welding, or by any other well known means.

After these units are complete they are adapted to be connected end to end by the usual pipe couplings 17, as shown in Fig. 1, so that any number of drill pipe units can be added to the floating drill pipe as needed, and when so connected the passages through cylinders 11 will be in register so that mud 18 can be forced freely down through the drill pipe.

In operation the units are added to the floating drill pipe as needed and are lowered into the well 19, as the excavation is deepened by means well known in the art, which means includes the driving of mud downwardly under pressure through the rotating drill pipe to the bottom of the well, and through a drilling tool, not shown, but well understood in the art; and then the mud passes upward outside of the drill pipe to remove or carry upward out of the well the sand and disintegrated rock and soil loosened by the drill bit. As the drill bit is lowered in the well the air chambers 16 between the disks 15 operate as floats to support the weight of the drill pipe or cause the drill pipe to float in the mud; and also they reinforce the cylinder so that the floating drill pipe cannot be easily bent, buckled or broken in the operation of drilling a deep well.

I claim as my invention:

In a drill pipe for deep wells, the combination of a plurality of units adapted to be abutted end to end and secured together by cylindrical pipe couplings, each unit including an inner and outer cylinder of substantially the same length with the inner cylinder arranged centrally in the outer cylinder and spaced apart throughout their lengths so that when the units are assembled the adjacent ends of the cylinders engage one another and the openings through the inner cylinders are aligned, ring bands welded to the inner wall of the outer cylinder adjacent its ends to reinforce the threaded portions of the outer cylinder, other ring bands welded to the outer wall of the inner cylinder adjacent its ends, and end plates arranged on and brazed to said ring bands so that the outside surfaces of said end plates are flush with the ends of said cylinders, said ring bands forming seats adjacent the ends of said cylinders to facilitate securing said end plates thereto.

In witness whereof, I have hereunto affixed my signature.

CHARLES EDWARD WOOD.