Jan. 14, 1958 A. W. GAGE 2,819,875

HYDRAULIC BORING DEVICE

Filed Sept. 8, 1954 2 Sheets-Sheet 1

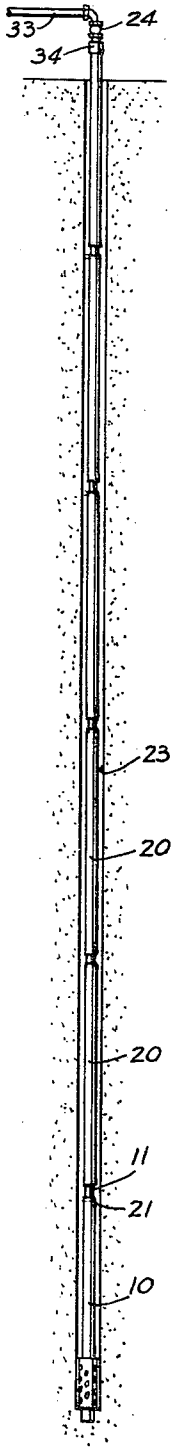


FIG. 1

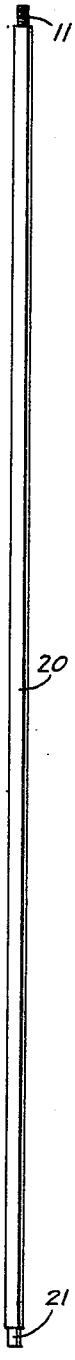


FIG. 2

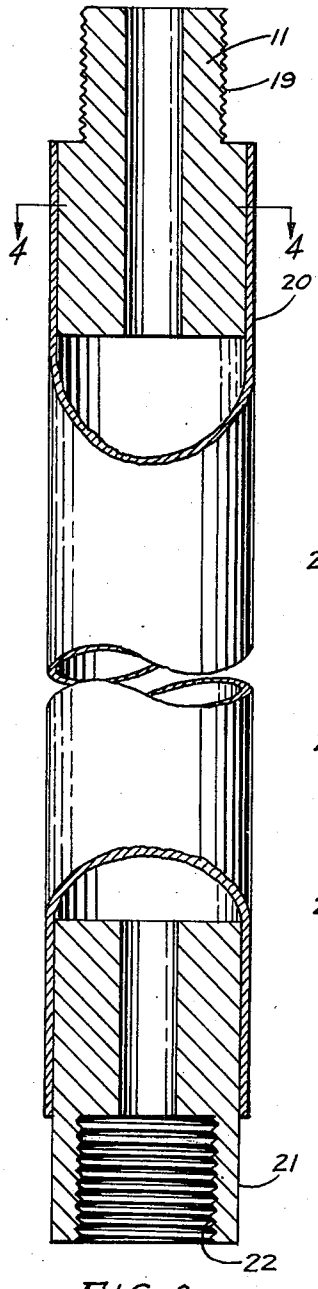


FIG. 3

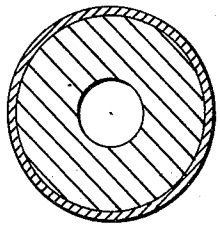


FIG. 4

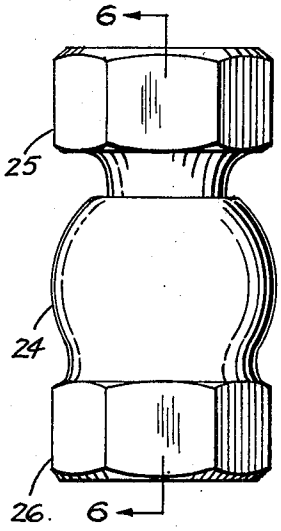


FIG. 5

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HYDRAULIC BORING DEVICE

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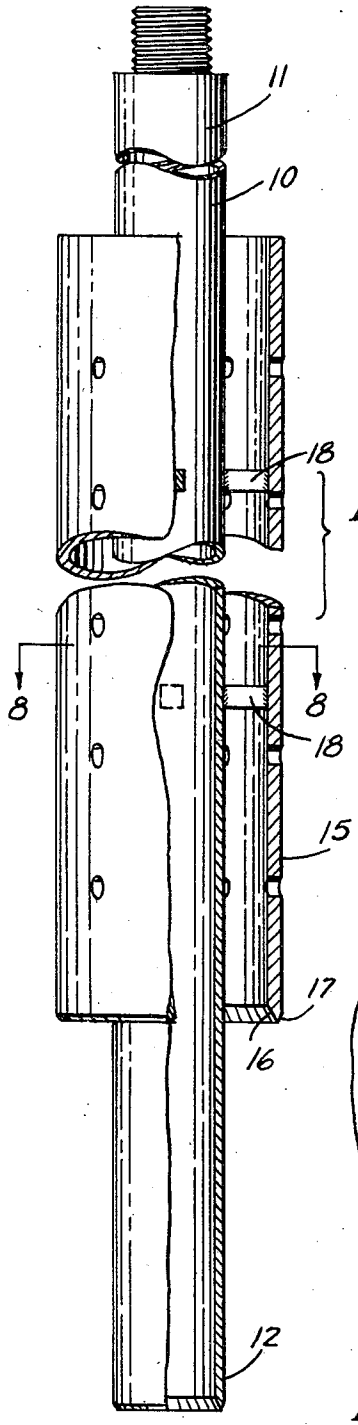


FIG. 7

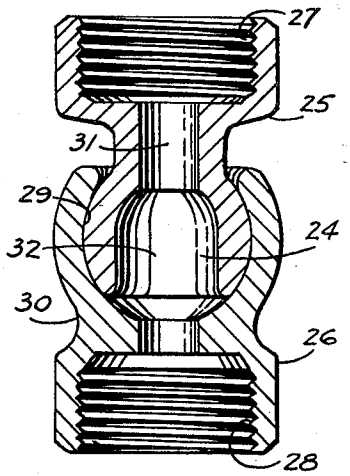


FIG. 6

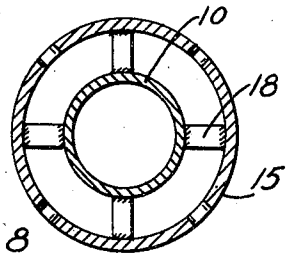


FIG. 8

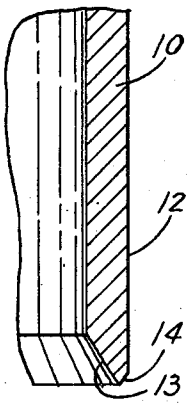
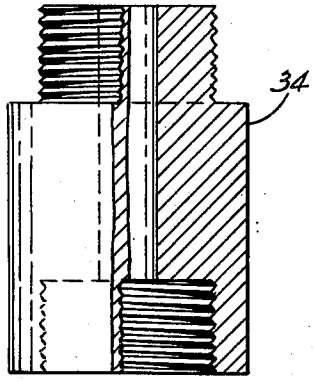


FIG. 9

FIG. 10



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HYDRAULIC BORING DEVICE

Archie W. Gage, Forest Grove, Oreg.

Application September 8, 1954, Serial No. 454,698

3 Claims. (Cl. 255—24)

The present invention relates to well boring equipment and particularly to a hydraulic jet system for sinking a hole or bore into the ground for the purpose of constructing a well for water.

The principal object of the present invention is to provide a device of simple and effective construction for applying a jet of water to bore a hole in the ground, and one which has a particularly constructed sleeve attached to it near its jet end for determining the size of the hole and to keep the jet pipe free from binding in the hole.

Another object of the present invention is to provide an easily fabricated jet pipe and boring sleeve for use as a boring tool in constructing water wells, and one with particularly constructed joints which secure the pipe in sections in leakproof condition.

A further object of the present invention is to provide a device for boring wells for water which is economical to use and will bore holes in most earth formations which may include soft rock strata.

These and other objects and advantages of the present invention will be readily apparent from the following description when considered with the accompanying drawings, in which:

Figure 1 is a view of the present invention as in use boring a well,

Figure 2 is a view of one length of pipe as used in Figure 1,

Figure 3 is a side view partly in cross section showing the bushing connectors secured in each end of a pipe section,

Figure 4 is an end view on line 4—4 of Figure 3,

Figure 5 is a side view in elevation of a universal joint connector,

Figure 6 is a cross sectional view of the joint as seen on line 6—6 of Figure 5,

Figure 7 is a view partly in cross section of the lower end of the pipe,

Figure 8 is a vertical end view in cross section on line 8—8 of Figure 7,

Figure 9 is an enlarged view of the cutting edge of the pipe, and

Figure 10 is a view partly in cross section of a nipple connector for use with the pipe of the present invention.

Referring in more detail to the drawing, in which like numerals indicate like parts throughout the several views it will be seen that the present invention consists of a sectional pipe **10** of seamless steel tubing constructed in sections of approximately ten feet in length and having brazed or welded in one end a bushing connector **11** made of bronze or other non-corrosive metal.

The other end **12** is formed with a cutting edge having two beveled faces **13** and **14**. At a spaced distance from the end **12** is positioned a perforated sleeve **15** having its same lower or complemental end provided with an identical cutting edge with two beveled faces **16** and **17**.

The sleeve **15** is of a larger diameter than the pipe **10** and is concentrically secured to the pipe at a spaced distance by the welded studs **18**, here shown in Figure 8 as being four in number in one plane and being disposed near each end of the sleeve **15**. The sleeve is perforated for most of its length for a purpose to be described later.

In Figure 3 the bushing connector **11** is seen to fit within the upper end of the pipe and formed with external threads **19**. The pipe **20** in this view differs from the pipe **10** by not having the cutting edge or sleeve, and has the other bushing connector **21** formed with the internal threads **22**. As seen in Figure 1 the pipes **10** and **20** are joined by their matching couplings or bushing connectors **11** and **21**, as the bore **23** deepens.

In Figures 5 and 6 the universal or swivel joint **24** is seen to be made of two bodies **25** and **26** both having an internally threaded one end **27** and **28** respectively, the other end of the body **25** having a ball end **29** and the other body **26** having its other end formed with a socket formation **30**.

A passageway **31** connects the bodies **25** and **26**, the former having an enlarged bore **32** in its ball end so that it may be angularly disposed relative to body **26** and still have an open passageway therethrough. The internally threaded end **27** of the body **25** is made with threads which receive the male end of a flexible hose **33** and a special adapter **34** shown in Figure 10 is used to connect the swivel joint to the top pipe as seen in Figure 1, so that the hose **33** cannot get wound up as it supplies water to the pipes **10** and **20**.

The perforations of the sleeve **15** permit water to reach the walls of the bore as the cutting edges of both the pipe and the sleeve dislodge the rock and soil under the impact of lifting and dropping the assembled pipes, and under the wearing action of the jet of water which flows rapidly and with such force as is found necessary out of the end of the pipe **10** thence upwardly through the sleeve **15**, carrying the dirt upward to the surface of the ground. The water through the perforations helps to lubricate the sleeve in the hole it bores.

In operation, the pipe **10** is first used connected to the swivel joint and to the hose, then when it has penetrated the earth to where only a short length of its upper end remains above ground, the pipe **10**, is joined to one of the pipes **20** and to the swivel joint and hose, and the boring is resumed until water is reached.

The sleeve **15** may be as large as six inches in diameter, although sizes of three inches and five inches have proved successful on a tube or pipe of one and one half inches in diameter and having a thickness of one-sixteenth of an inch. The bushing connectors and the swivel joint have a seven-eighths of an inch bore through them.

While only a single preferred embodiment has been here shown and described, other embodiments of the present invention may be made and practiced and many changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. A hydraulic boring device comprising a pipe having a passage therethrough, means connecting said pipe at one end to a source of fluid under pressure, and a perforated sleeve surrounding and spaced from said pipe and secured to said pipe at a spaced distance from its other end, said pipe and said sleeve having their complemental lower ends formed with beveled cutting edges.

2. A hydraulic boring device comprising a pipe having a passage therethrough, a bushing connector secured to said pipe at one end thereof, said connector having external threads and being provided with a passageway

therethrough in communication with said pipe, means connecting said bushing to a source of fluid under pressure and a perforated sleeve surrounding and spaced from said pipe and secured to said pipe at a spaced distance from its other end, said pipe and said sleeve having their complemental lower ends formed with beveled cutting edges.

3. A hydraulic boring device comprising a pipe having a passage therethrough, a bushing connector secured to said pipe at one end thereof, said connector having external threads and being provided with a passageway therethrough in communication with said pipe, means including a swivel joint connecting said bushing to a source of fluid under pressure, and a perforated sleeve surrounding and spaced from said pipe and secured to said

pipe at a spaced distance from its other end, said pipe and said sleeve having their complemental lower ends formed with beveled cutting edges.

References Cited in the file of this patent

UNITED STATES PATENTS

1,338,460	Morrison	Apr. 27, 1920
1,445,289	Bron	Feb. 13, 1923
1,515,066	Ochs	Nov. 11, 1924
1,963,368	Johnson	June 19, 1934
2,323,027	Gerstenkorn	June 29, 1943

FOREIGN PATENTS

1,070,038	France	July 15, 1954