(No Model.)

S. ADAMS.

WELL DRILLING CABLE.

No. 602,419. Patented Apr. 19, 1898.

Fig. 2

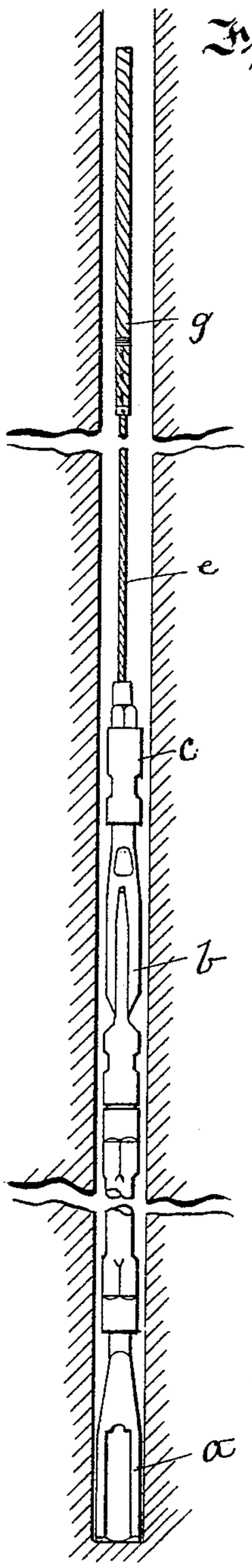


Fig. 1

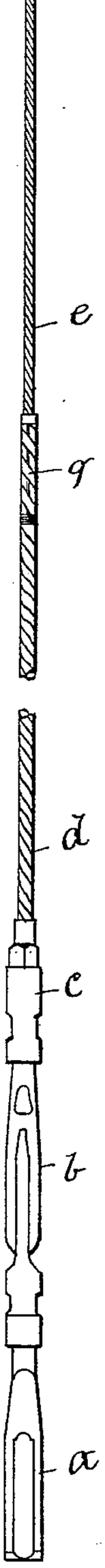
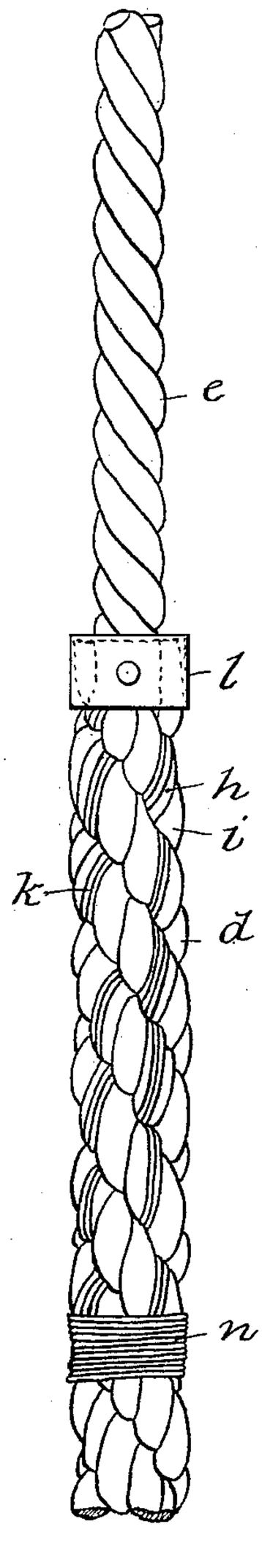


Fig. 3



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UNITED STATES PATENT OFFICE.

SAMUEL ADAMS, OF BEAVER, PENNSYLVANIA, ASSIGNOR TO THE FRICK & LINDSAY COMPANY, OF PITTSBURG, PENNSYLVANIA.

WELL-DRILLING CABLE.

SPECIFICATION forming part of Letters Patent No. 602,419, dated April 19, 1898.

Application filed February 11, 1895. Serial No. 537,913. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL ADAMS, a resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Well-Drilling Cables; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to well-drilling cables, its object being to provide a cable which is more durable than the ordinary hemp rope and which possesses all the advantages of spring or elasticity found in that rope to impart the desired stroke to the drilling-bit. The ordinary hemp rope employed for drilling is objectionable because of the abrasion caused on its surface by the rock through which the well is drilled and because it becomes saturated with the water contained in the well, increasing the weight to be lifted in drilling. Wire rope has been tried to some extent, but, though durable on account of its wearing qualities, it is too rigid to give the spring for the drilling stroke, and if the tools stick is liable to be broken under the strain in raising them because of its lack of elasticity, and has not been found satisfactory. By my invention I have provided a cable which possesses the desirable features of both the hemp and the wire rope.

It consists, generally stated, of a well-drilling cable composed of sections of wire rope and hemp or fiber rope connected together and adapted to extend between the drilling-tools and the power mechanism, it being found that such cable has all the necessary spring or elasticity to impart the desired drilling stroke to the drilling-bit and that it has practically the wearing qualities of the wire rope, and as the greater part of it is of wire and is of small diameter it does not become saturated with the water in the well and it requires less power for the drilling operation.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figures 1 and 2 are sections of wells, illustrating the manner of using my improved cable; and Fig. 3 is an enlarged view illustrating the joint between the wire rope and hemp rope.

Like letters of reference indicate like parts in each of the views.

The drawings show the preferred way of using my improved cable, Fig. 1 showing the tools and the cable, in which *a* is the drilling-bit, *b* the drill-jars, and *c* the rope-socket, to which the hemp or fiber rope *d* is connected in any suitable way. The wire rope *e* forms the main part of the cable and extends from the top of the well down to the hemp rope *f*, to which it is connected at *g*. I find that only a short length of hemp rope is necessary, the most desirable length depending upon the weight of the tools and the depth of the well. The hemp rope need not be more than one-tenth the length of the wire rope, and for general drilling in deep wells I find that from one hundred feet to two hundred feet is sufficient. While I prefer to employ the hemp rope at the lower end of the cable, it may form the upper section thereof, being connected to the power mechanism, and the wire rope extending down to and being connected to the drilling-tools, and this way of working would have advantages in the fact that the hemp rope would in ordinary cases be above the water in the well. Fig. 2 shows this way of employing the cable.

Any suitable joint or connection between the two ropes may be employed. I have joined them in the manner illustrated in Fig. 3 by opening out the strands of the wire rope and passing or splicing them back and forth through the hemp rope. For example, where the wire rope has six outer strands and the hemp rope has three strands the wire rope is opened out for a distance of about a couple of feet and entered lengthwise into the end of the hemp rope, two wire strands, as at *h*, being drawn out together between the hemp strands *i* and carried over one of the hemp strands, as at *k*, and then passed back between the hemp strands, and in this way the several wire strands being plaited or spliced over and between and through the hemp strands when the hemp strands remain in their ordinary "lay" or twist of strands. The end of the hemp rope can be bound around

the wire rope by any suitable means to prevent its unstranding, such as by means of a copper or other metal band *l*, passed around the same and held to place by the rivet *m*, passing through the ropes and the band. The same means may be employed to protect the free ends of the wire strands, or they may be passed into the body of the hemp rope, or the part of the hemp rope where they end may be wound with wire or wire rope to hold them in place, as at *n*. The advantage of this form of joint is that as the wire strands pass over and back and forth through the hemp rope the drawing strain on the cable simply causes the wire strands to bind more firmly around and against the hemp strands and press into them, and it is found that a joint of this kind is permanent, strong, and lasting. It has also the further advantage that when the cable is withdrawn from the well the joint will pass easily over the crown-pulley at the top of the derrick.

When the drilling-cable is in use, the section of hemp rope is sufficiently elastic to give the desirable "whip" stroke to the drilling-tools which is most effective, the spring of the hemp rope providing for the quick downward movement and return of the tools, while the wire rope gives more positive control of the drilling-tools and being of small diameter passes through the water in the well with little friction and carries no water with it, as in the saturated hemp rope, and, what is most important, resists the abrasive action of the rock, and consequently is much more durable. In case the tools stick the hemp section will yield sufficiently to prevent breaking of the cable, as is liable to occur if only the rigid wire rope is employed. Practical use has proven that the cable drills more rapidly and with less expenditure of power than the ordinary hemp cable.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A well-drilling cable composed of sections of wire rope and hemp rope connected together and adapted to extend between the power mechanism and drilling-tools, substantially as set forth.

2. A well-drilling cable composed of an upper section of wire rope and a lower section of hemp rope connected to the lower end thereof, and adapted to carry the drilling-tools, substantially as set forth.

3. A joint for a well-drilling cable composed of sections of wire rope and hemp rope, formed by inserting the wire rope in the end of the hemp rope and plaiting or splicing the wire strands between and over the hemp strands when the hemp strands remain in their ordinary "lay," substantially as set forth.

4. A joint for a well-drilling cable composed of sections of wire rope and hemp rope, formed by inserting the wire rope in the end of the hemp rope and plaiting or splicing the wire strands between and over the hemp strands when the hemp strands remain in their ordinary "lay," and a band surrounding the end of the hemp rope and holding it in "lay," substantially as set forth.

In testimony whereof I, the said SAMUEL ADAMS, have hereunto set my hand.

SAMUEL ADAMS.

Witnesses:
JAMES I. KAY,
ROBERT C. TOTTEN.