(No Model.)

H. S. GAIL.

Well-Boring Apparatus.

No. 229,996. Patented July 13, 1880.

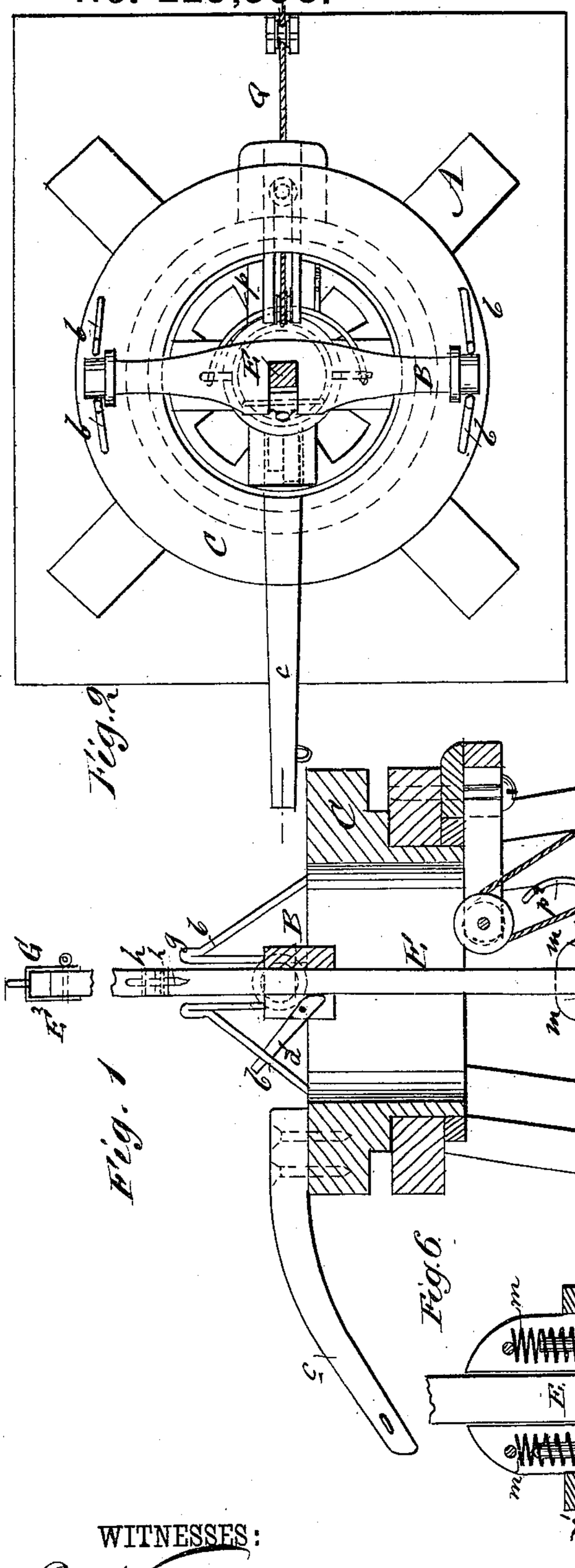

Fig. 2.

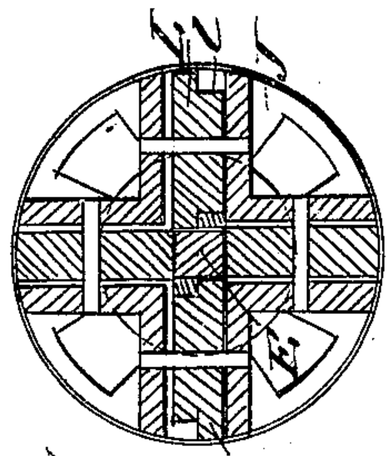

Fig. 3.

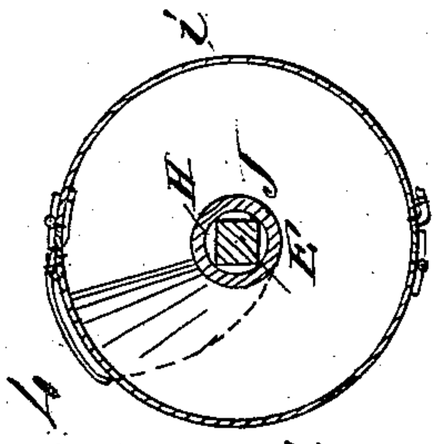

Fig. 4.

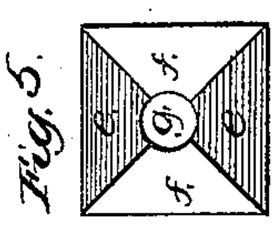

Fig. 5.

Fig. 1

Fig. 6.

WITNESSES:

C. Neveux

H. Sedgwick

INVENTOR:

H. S. Gail

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

HARRY SAMUEL GAIL, OF WAUKEGAN, ILLINOIS, ASSIGNOR TO HIMSELF AND GEORGE KIRK, OF SAME PLACE.

WELL-BORING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 229,996, dated July 13, 1880.

Application filed March 18, 1880: (No model.)

To all whom it may concern:

Be it known that I, HARRY SAMUEL GAIL, of Waukegan, in the county of Lake and State of Illinois, have invented new and useful Improvements in Well-Boring Apparatus, of which the following is a specification.

The object of the invention is to provide means for holding the auger to the rotary shaft in such a manner that they may be easily disconnected to allow of the withdrawal of the auger without disturbing the shaft, as hereinafter more fully described.

In the accompanying drawings, Figure 1 represents a vertical section of an apparatus embodying my improvements. Fig. 2 is a top view. Fig. 3 is a horizontal section taken in the line *x x* of Fig. 1. Fig. 4 is a horizontal section taken in the line *y y* of Fig. 1. Fig. 5 is a detail view. Fig. 6 is an enlarged vertical section of the sleeve which carries the friction-rollers and wedges.

Similar letters of reference indicate corresponding parts.

A is the derrick, consisting of posts surmounted by a circular top, in which works an annular cap, C, provided with a beam, *c*, for turning it either by hand or horse power. On the top of the cap rests a cross-head, B, the ends of which work between standards *b*, which cause it to turn with the cap, but allow it to rise and fall when necessary. In the center of the cross-head is an opening for engagement with the boring-shaft E. In this opening is a cam, *d*, which bears against and holds the shaft sufficiently steady, but allows it to descend as the boring proceeds.

The boring-shaft E may be in its cross-section either cylindrical, ellipsoidal, or angular. It is here shown as square. At its lower end it carries the auger-point *j*. At its upper end the mode of coupling is as follows: At the upper end of the shaft two triangular recesses, *e e*, (see Fig. 5,) are formed diametrically opposite each other, with two triangular shoulders, *f f*, between them, from the center of which projects a vertical pin, *g*, with a transverse hole through it near its upper end. The section to be coupled to the shaft has its lower end provided with corresponding recesses and shoulders, in the center of which is a socket for the reception of the pin *g*.

In coupling the sections of the shaft the shoulders *f* of one section engage with the recesses *e* of the other section, the pin *g* engages with the socket in the other section, and a pin, *h*, is passed through the transverse hole in the pin *g*, and thus the parts are held securely together.

When the shaft is in use a short section, E^2, is attached to its upper end by the means above described. This short section is provided with a swivel-clevis, G, for the attachment of a rope to regulate the depth of cut and keep the shaft in the proper vertical position.

The auger J is provided with hinged doors *i i*, which may be opened to unload it. The auger is attached to a tube, H, through which the boring-shaft E passes. The upper end of the tube H is attached to a sleeve, K, which carries four friction-rollers, L, arranged to bear against the shaft E. In the face of each friction-roller is a groove, *l*, in which works a wedge, M, on the upper end of which is a shank surrounded by a spring, *m*, said wedge working between the roller L and shaft E in a groove in the sleeve K, and the ends of the spring bearing against abutments, so as to have a tendency to keep the wedge M pressed downward. Projecting from the wedges M are pins *n*, which engage with a collar, N, having a flange on its upper edge. Surrounding the collar N is a loose collar, P, provided with lugs, to which is attached a bail, *p*, having an arm, p^2, extending outward from it. Attached to the bail *p* is a rope, Q, which passes over a pulley at the top of the derrick, thence under a pulley at the base of the derrick, and thence to a capstan or windlass.

As the sleeve K, rollers L, and wedges M compose the head-piece of the auger, and the shaft E is held in its central aperture by the pressure of the wedges, the rotation of the shaft causes the auger and bit to revolve and work into the earth.

The friction of the wedges M against the shaft E is sufficient to give the necessary pressure to cause the shaft and auger to turn

together and force the auger and the point of the said shaft into the earth.

When the auger becomes full it is raised by pulling the rope Q. The pulling of the rope Q, which is attached to the bail *p* of the collar P, causes said collar to bear under the flange of the collar N and raise and loosen the wedges M, so as to allow the sleeve K to slide freely on the shaft E, said collars P and N in that action taking under the upper head, N′, of the sleeve K. Thus the auger is raised without the necessity for raising the shaft. On reaching the surface the auger is emptied and again allowed to descend.

When the auger is at work the arm p^2 rests against the side of the well, and thus prevents the turning of the collar P and twisting of the rope.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the shaft E and sleeve K, of the rollers L, wedges M, and springs *m*, as shown and described, for the purpose specified.

2. The combination, with the wedges M and sleeve K, of the flanged collar N, loose collar P, bail *p*, and rope Q, as shown and described, for the purpose specified.

HARRY SAMUEL GAIL.

Witnesses:
C. T. HEYDECKER,
CHAS. STEINKAMP.