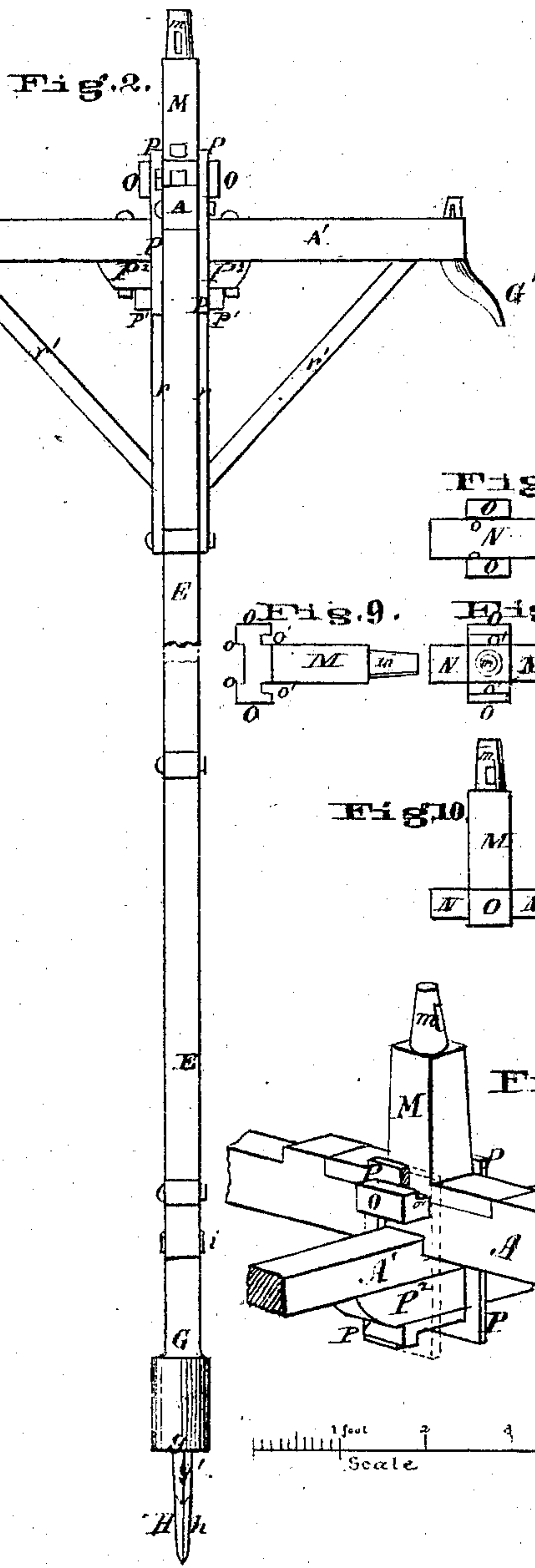
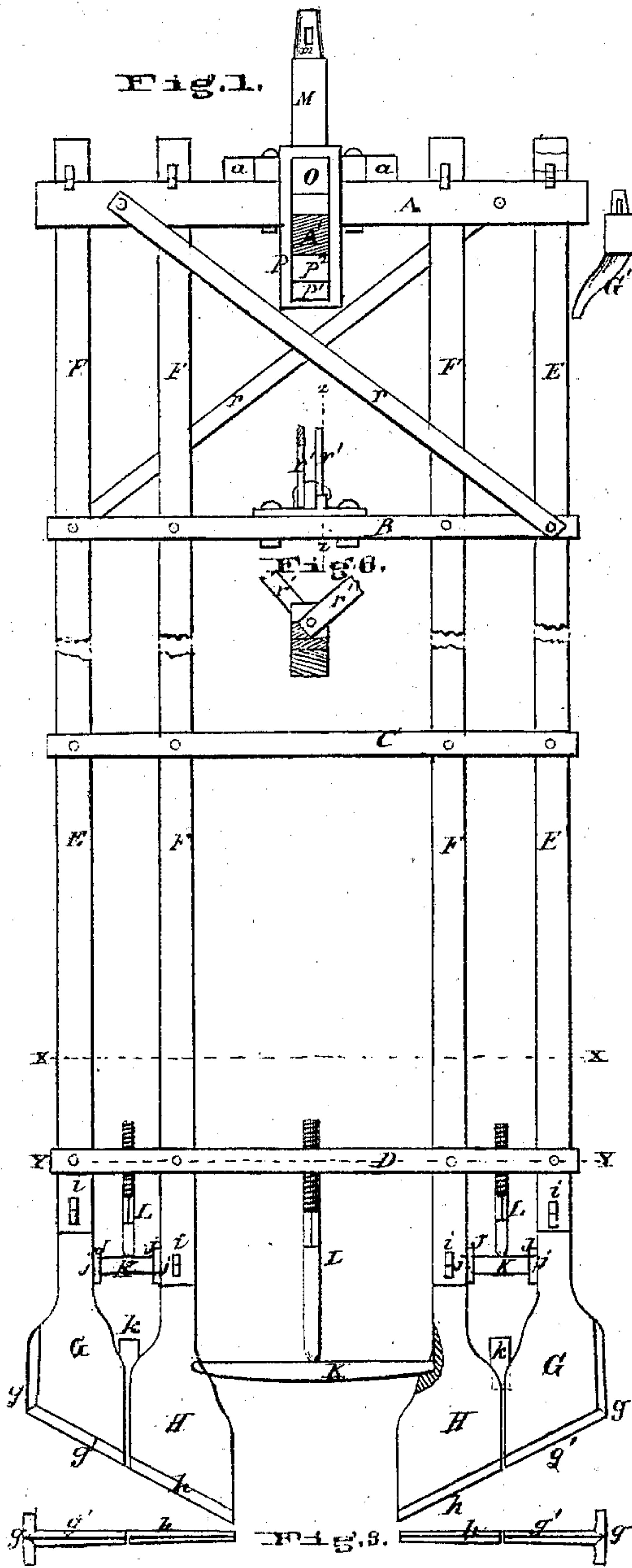


H. SONTAG.

Improvement in Apparatus for Sinking Shafts.

No. 130,543.

Patented Aug. 13, 1872.



INVENTOR,

Hugo Sontag

ATTEST,
Sam'l Knight.
R T Mawley

UNITED STATES PATENT OFFICE.

HUGO SONTAG, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN APPARATUS FOR SINKING SHAFTS.

Specification forming part of Letters Patent No. 130,543, dated August 13, 1872.

Specification describing a certain Improved Shaft-Boring Apparatus, invented by HUGO SONTAG, of the city and county of St. Louis, and State of Missouri.

My invention relates to the construction of a drill-frame and drills, as hereinafter described.

Figure 1 is a side elevation of my device, showing the top cross-bar in section. Fig. 2 is an elevation at right angles to Fig. 1. Fig. 3 is a bottom view of the lower bits. Fig. 4 is a section at the line *x x*, Fig. 1. Fig. 5 is a section at line *y y*, Fig. 1. Fig. 6 is a section at the line *z z*, Fig. 1. Fig. 7 is a bottom view of the shank or neck by which the drill-frame is supported, and Fig. 8 is a top view, and Figs. 9 and 10 side views, of the same. Fig. 11 is a perspective view, representing the mode of attaching the shank to the upper part of the frame, as hereinafter described.

A B C D are horizontal bars, serving to connect together four vertical bars or drill-rods, E E F F, to whose lower ends the bits G H are attached by socket-connections secured by traversing-keys *i*. The outer bits G are T-formed in transverse section, the outer edge *g* being slightly curved to suit the inside of the shaft under construction. The edge *g'* of these bits is in a radial direction, but somewhat inclined from the horizontal, as shown, so that shaft-bottom shall incline downwardly toward the center, causing the loosened matter to pass inward to a smaller bore previously sunk or formed in advance by a drill of smaller diameter. A receiver or sand-pump occupying the smaller bore, may be suspended from one of the bars C D, or otherwise. The cutting-edge *h* of the bits H has the same inclination as the edge *g'*. This inclination may be about thirty degrees from the horizontal. The inner sides of the bits G G and the lower ends of the rods F have side lugs or projections J, which have inclined grooves *j*, shown by dotted lines, the lower portions of the slots decreasing in depth downward. The sides of the bits H are also grooved, as shown. These slots receive the ends of the struts K, whose office it is to prevent the bits from being forced inward. L are rods, whose

upper ends are screwed into the bar D, and whose lower ends rest upon or enter cavities in the struts to hold them down in their slots. The contiguous sides of the bits G H have slots or grooves to receive the edges of keys *k*, which serve to hold the bits rigidly in place. A' is a cross-bar extending at right angles to the bar A, and armed at each end with a bit, G', which bit acts to guide the frame and to smooth or perfect the inside of the shaft. The frame is held together by rivets at the intersections, as shown. The shank or neck M is of crucial form at its base, (see Fig. 7,) and its upper end *m* is of tapering form, and enters a socket in the rod by which the frame is supported. I prefer to support the drill-frame upon my dropping apparatus or "jar-movement for rock-drills," patented by me the 1st day of August, 1871, (No. 117, 573;) but my drill-frame may be supported on any other suitable apparatus. The cross-bar N lies upon the upper side of the bar A, fitting tightly between two lugs or blocks, *a*, forming part of or attached to the said bar. O are side projections of the shank. These projections have shoulders *o* embracing the upper part of the bar A, and channels or grooves *o'* to receive the upper ends of the rectangular links or straps P extending down each side of the bar A, and beneath the cross-bar A', and secured by a gib, P¹, and cotter or wedge P² beneath the cross-bar. *r* are braces extending from the bar A to bar B, and *r'* are braces extending from cross-bar A' to bar B. I do not confine myself to four rods, E F, as shown, or to a frame of any particular width; but the frame shown is supposed to have a width of seven feet from *g* to *g*, and from G to G' and the drill-rods or bars E F to be of five-inch square iron. Any number of rods or bars E F may be used. The frame may be fifteen feet, more or less, in length.

The operation of my apparatus is similar to that of other drop-drills—viz, it is alternately raised and allowed to fall, and may have partial rotation at each stroke, (by suitable mechanism,) if desired.

I claim as my invention—

1. The combination of the bits G H, when constructed and arranged as described, the

keys *k* by which they are connected and made mutually supporting, and the bars *E F* to the ends of which they are attached, all substantially as and for the purposes set forth.

2. The struts *K* and screw-rods *L*, in combination with the bars *D E F* and bits *G H*, substantially as and for the purposes set forth.

3. The connections *N O P P¹ P²* between the shank or neck *M* and the upper bar *A* of the frame.

HUGO SONTAG.

Witnesses:

SAML. KNIGHT,
R. F. ROADLEY.