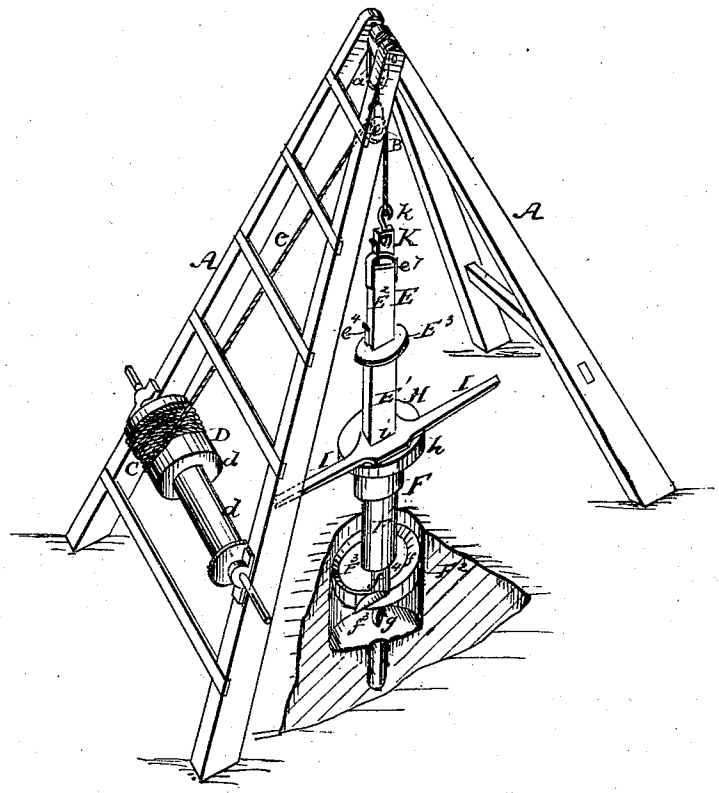
2 Sheets—Sheet 1.

M. H. RUTH & W. CRAIN.

EARTH BORING APPARATUS.

No. 169,590. Patented Nov. 2, 1875.

Fig. 1.



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2 Sheets—Sheet 2.

M. H. RUTH & W. CRAIN.

EARTH BORING APPARATUS.

No. 169,590. Patented Nov. 2. 1875.

Fig. 2.

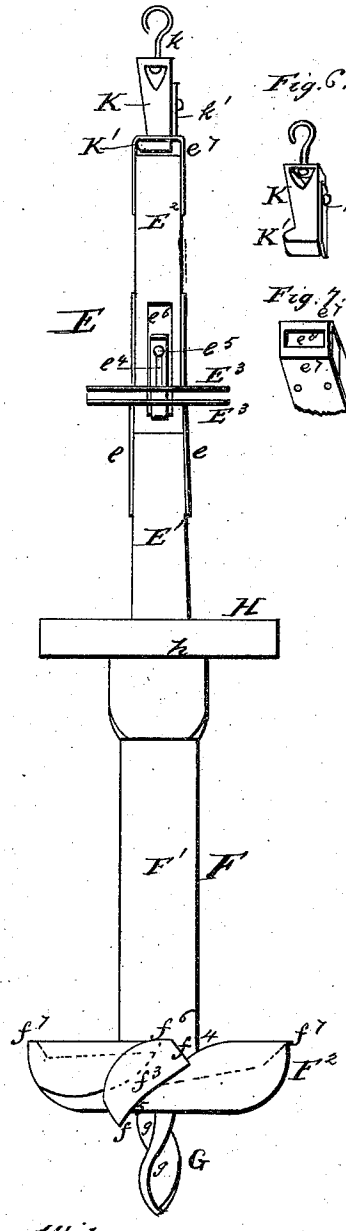


Fig. 6.

Fig. 7.

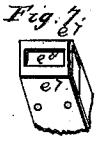


Fig. 8.

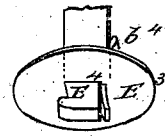


Fig. 9.

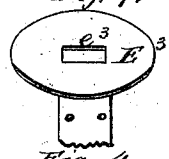


Fig. 4.
Section through A A

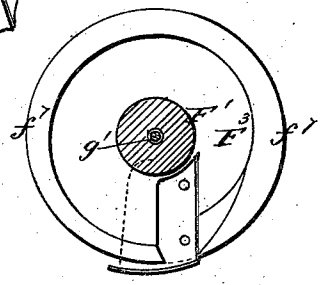


Fig. 5.
Underside View

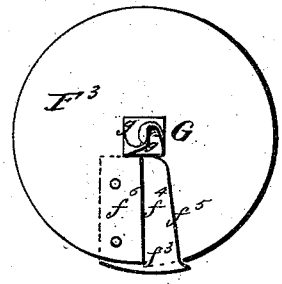
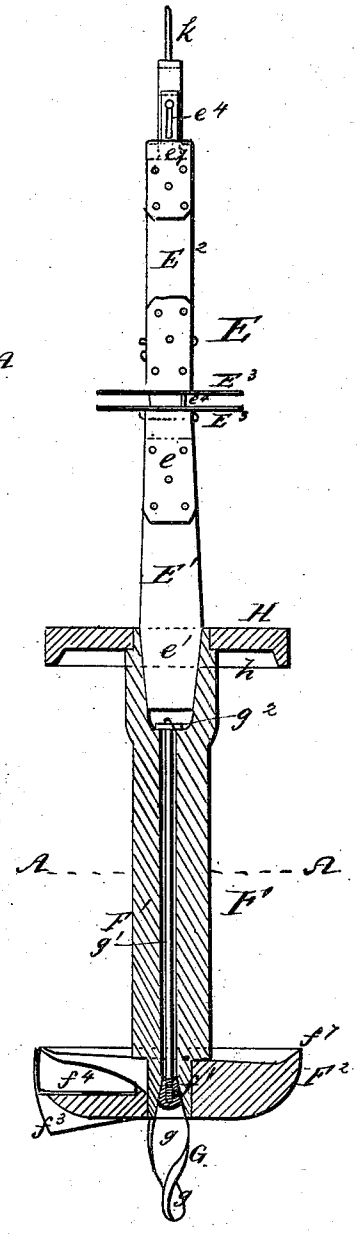


Fig. 3.



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UNITED STATES PATENT OFFICE.

MATTHEW H. RUTH, OF CLAIBORNE PARISH, AND WILLIAM CRAIN, OF FARMERSVILLE, LOUISIANA.

IMPROVEMENT IN EARTH-BORING APPARATUS.

Specification forming part of Letters Patent No. **169,590**, dated November 2, 1875; application filed June 25, 1875.

To all whom it may concern:

Be it known that we, MATTHEW HARLEY RUTH, of the parish of Claiborne, and WILLIAM CRAIN, of Farmersville, in the parish of Union, both in the State of Louisiana, have invented certain Improvements in Apparatus for Boring Wells, of which the following is a specification:

Our invention relates to improvements in apparatus for boring wells, the nature of which will be fully explained by the following specification, reference being had to the accompanying drawings, which form part of the same.

Figure 1 represents a perspective view of a well-boring apparatus, constructed according to our invention. Fig. 2 is an external view, and Fig. 3 a similar view, of the auger and parts connected therewith on a larger scale. Figs. 4, 5, 6, 7, 8, and 9 represent detail views of parts.

A represents a derrick, to the center of which is affixed a loop, *a*, for the attachment of a pulley-block, B. C is a cord or chain passing over the pulley B, one end of which is attached to the winch-drum D, while its opposite end is formed with a loop or ring for the purpose of attachment to the swivel-hook *k* attached to the upper end of the coupling rod or shaft E. F represents the auger, which is composed of a hollow central shaft, F^1, the lower end f^1 of which is squared, as shown, and inserted into the center of the cutter F^2, which is provided with a cutting-blade, f^3, affixed in a slot or opening, f^4, formed between the extremities f^5 f^6 of the screw-thread F^3, which gradually inclines upward in a circular direction from the point f^5 to the point f^6. The screw-blade F^3 of the cutter F^2 is formed with a projection or rim, f^7, for the purpose of guiding the earth inward, as hereinafter explained. G is a bit, provided with screw-threads *g*, and applied to the under side of the squared portion f^1 of the central shaft F, below the cutter F^2, for the purpose of guiding the apparatus centrally. The bit G is formed at its upper end *g* with tapering sides, so as to fit into a correspondingly-shaped recess in the end of the hollow shaft F, and is secured in position by means of a rod, g^1, passing up through the hollow shaft F^1, and secured at its upper end by means of a screw-nut, g^2. H is a circular plate or extension, formed on or affixed to the upper end of the shaft F^1, and provided with a rim, *h*, on its under side to facilitate the retention and raising of the earth from the well. The coupling rod or shaft E is formed in sections E^1 E^2, the section E^1 being formed at its lower end *e'* with inclined sides adapted to fit into a correspondingly-formed socket, F^4, in the upper end of the shaft F, while its upper end is provided with plates or connecting-pieces *e e* supporting a disk or plate, E^3, in the center of which is formed a slot, e^3, for the reception of a notched projection, E^4, formed on the lower end of the section E^2, which is also provided, as shown, with a plate or disk, E^3. e^4 is a sliding piece affixed with capability of vertical movement on a pin, e^5, within a slot or groove, e^6, in the side of the section E^2. The object of this sliding piece e^4 is that when the notched projection E^4 is inserted into the slot e^3 it may be forced down and prevent the removal of the notched piece E from the slot e^3 in the plate E^3 until desired, as hereinafter more fully explained.

The upper end of the section E^2 is provided with a socket-piece, e^7, formed with a slot or opening, e^8, adapted to receive the notched end K' of the swivel-piece K, which is provided with a sliding retaining-plate, *k'*. *k* is a swivel-hook, by means of which the apparatus is connected with the rope or chain C, as shown by Fig. 1.

In the drawings I have shown only two sections, E^1 E^2, of the coupling rod or shaft E. In practice, however, a series of sections will be employed, according to the depth of the well to be bored. The sections to be introduced between the sections E^1 E^2 are each provided at each end with plates or disks E^3, the plate at the upper end of each being provided with a slot, e^3, as shown by Fig. 9, while the lower one is formed with a notched projection, E^4, and sliding piece e^4, as shown by Fig. 8, for the purpose of connecting the sections together.

The winch-drum D, as shown by Fig. 1, is formed of different diameters, the part *d* being by preference one-third of the diameter of the

part *d'*. The object of this construction of the drum B is, that when the auger F is not loaded it may be drawn up quickly by placing the rope or chain on the enlarged portion *d'*, but when the auger is loaded the same may be drawn up slowly by placing the rope or chain upon the part *d*. I is a double handle-piece, formed with a notch or recess, *i*, in its center, for the purpose of receiving and being held onto the shaft E, for the purpose of turning the same and the auger F, as will be readily understood.

The operation of the apparatus is as follows: The derrick A having been erected in position as shown by Fig. 1, so that its loop *a* shall be supported over the center of the well to be bored, the auger F and coupling-rod E are then suspended to the end of the chain or rope C, and worked downward in the ordinary manner, well understood by those acquainted with well-boring. In the revolution of the auger F, the earth removed by the cutting-blade f^3 will be forced up through the opening f^4 into the space between the cutter F^2 and the plate or extension H, which is gradually filled until the earth rises to the level of the under side of the plate H. The coupling-rod E and auger F are then drawn out of the well by means of the rope C and windlass D, and the earth collected and retained in the space between the cutter F and plate H removed, after which the apparatus is again inserted into the well, and the operation repeated again and again until the well has been bored to the desired depth, sections of shafting E, constructed as described, being inserted between the sections E^1 E^2, as required, as the well becomes deeper.

By thus constructing well-boring apparatus, it will be readily seen that great ease and economy of working are obtained, combined with simplicity of manufacture.

It will be further evident to those acquainted with the use of apparatus of this character that the well will be finished of the same diameter through its entire depth, and the walls are not liable to damage. This is by reason of the plates or disks E^3 coming close together when the apparatus is at work, and retaining the whole of the sections of the shafting, and also the auger perfectly rigid and in a vertical position.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The auger F, constructed with a hollow central shaft, F^1, screw-blade F^3, rim f^7, cutting-blade f^3, bit G, and plate or extension H, and rim *h*, substantially as and for the purposes described.

2. The combination, with a well-auger, of a shaft, E, composed of a series of sections provided with plates or disks E^3 at their adjacent ends, substantially as and for the purpose specified.

3. The combination, with a well-auger, of a shaft, E, composed of a series of sections provided with plates or disks E^3 at their adjacent ends, and connected together by notched projections E^4, sliding pieces e^4, and slots and recesses e^3, substantially as set forth.

4. The combination, with a well-auger shaft, E, composed of a series of sections provided with plates or disks E^3 at their adjacent ends, of the swivel-piece K, provided with a notched end, K', and retaining-piece *k'*, and swivel-hook *k*, substantially as described.

5. The combination, with a derrick, A, provided with a winch-drum, D, formed with parts *d d'*, of different diameters, the rope C, and pulley B, of the sectional shafting E, provided with plates or disks E^3 and the auger F, substantially as and for the purposes described.

In witness whereof we have hereunto set our hands this 8th day of June, 1875.

MATTHEW HARLEY RUTH.
WILLIAM CRAIN.

Witnesses:
W. R. ROBERTS,
J. C. CARGILL.