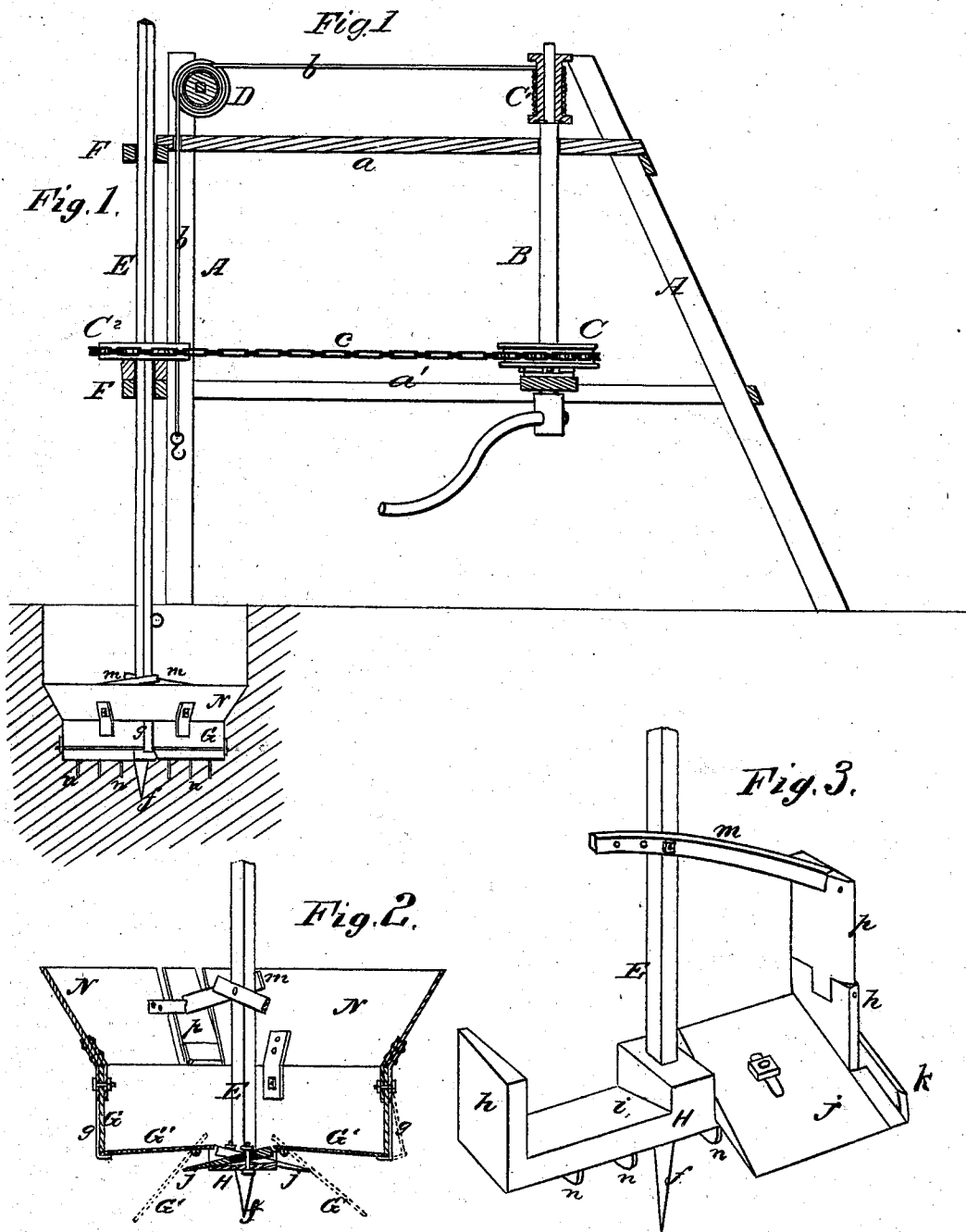


F. S. BURT.
Earth-Augers.

No. 149,717.

Patented April 14, 1874.



WITNESSES
E. H. Bates.
Geo. S. Upham. By

INVENTOR
Francis S. Burt
Chipman and Sonnet & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

FRANCIS S. BURT, OF MOUNT PLEASANT, IOWA.

IMPROVEMENT IN EARTH-AUGERS.

Specification forming part of Letters Patent No. **149,717**, dated April 14, 1874; application filed March 7, 1874.

To all whom it may concern:

Be it known that I, FRANCIS S. BURT, of Mount Pleasant, in the county of Henry and State of Iowa, have invented a new and valuable Improvement in Well-Boring Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a sectional view of my device. Figs. 2 and 3 are detail views of the same.

This invention has relation to machinery which is designed for boring into the earth, and which is especially designed for boring wells for obtaining water. The nature of my invention consists in an auger, which is surrounded by a deep rim and provided with hinged bottoms for discharging the loose earth collected in it, in combination with horizontally-cutting blades or bits, and vertical slicers or cutting-fins, so arranged that the latter will precede the bits and loosen the earth, and thus lessen the work of the bits.

Other features of my invention, together with a more full explanation of those above referred to, will now be explained.

In the annexed drawings, A designates a frame, which is adapted for supporting the auger-shaft and the machinery for rotating this shaft, and raising the same to discharge the loose earth. B is a vertical shaft, which has its bearings in horizontal beams *a a'* of the frame A, and to the lower end of which a sweep-lever is applied, by means of which horses can work the machinery. On this shaft I apply a sprocket-wheel, C, and a winding-drum, C', both of which can be engaged with or disengaged from the shaft at pleasure by means of suitable clutching devices. The winding-drum C' is designed for raising and lowering the auger, hereinafter explained, which is done by means of a rope or chain, *b*, that passes over a horizontally-arranged drum, D, and has a hook attached to it, as shown in the drawings. The sprocket-wheel communicates rotary motion to the auger through the medium of a "rag-chain," *e*, which passes around a sprocket-wheel, C², on the auger-shaft E.

The auger-shaft E is allowed endwise play through wheel C², but turns with this wheel. F F are the bearing-guides for the auger-shaft, through which guides this shaft is allowed free endwise movement, whether it be rotating or not. The auger is thus allowed to descend as the work of boring progresses.

While I prefer to construct the supporting-frame and driving mechanism as I have above described, I do not confine my improvements on the auger to such construction. I construct the auger with an annular rim, G, and a bottom which is composed of two hinged segments, G' G', held in place by catches *g*, by means of which the said segments can be released when the auger is drawn to the surface of the ground, and the earth which was collected in it discharged. The hinged segments G' G' are connected to the lower edge of the annular rim or band G, and this band, which is composed of two segments, is secured to rectangular portions *h h* of a strong cross-bar H, through the middle of the length of which the auger-shaft E passes, and is terminated by a centering-point, *f*. The bottom side of the cross-bar H is below the hinged auger-bottom, for the purpose of preventing undue friction thereon. Cross-bar H is beveled in opposite directions on opposite sides of the thickened portion through which the shaft E passes, for the purpose of affording inclined beds *i i* for the bits or cutting-plates *j j* to rest upon. These bits *j j* will be secured to the bar H by means of bolts and nuts, and there will be slots made through the bits, so that when the nuts are loosened the bits can be adjusted. If it is desired to change the pitch or inclination of the bits, I will use wedges beneath them. The outer ends of the bits *j j* are turned up outside of the rim or band G and sharpened, as shown at *k*, for the purpose of making a clearance for the rim and preventing undue friction thereon. The bottom of the cross-bar H is provided with cutting-fins *n*, for the purpose of making vertical cuts into the earth preceding the horizontal cutters, and thus, by loosening the earth, reduce the work of these cutters. To the upper ends of the rectangular portions *h h* of the cross-bar H, I hinge cutting-blades *p p*, which are adjustably connected to the auger-shaft E

87

by means of arms *m m*, for the purpose of fixing these blades at different angles. To these cutting-blades *p p* I secure the ends of two upwardly-flaring segments, *N N*, which are also secured to the upper edge of the band or rim *G*. The object of the cutters *p p* is to make a hole larger than is made by the cutters below them, so that, in commencing to bore, a very large hole may be made, and after going into the earth some distance, and it is found necessary to curb the well, a smaller hole may be made below the curbing by contracting the said cutters *p p*. I am thus enabled to make holes of different diameters with the same auger. The flaring segments can be detached from the auger when it is not required to use the expansible cutters.

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

1. The double-beveled cross bar *H*, with its angular ends *h h*, in combination with the cutters *j j k k*, and *n*, and with the annular rim *G* and hinged bottom segments *G' G'*, substantially as and for the purposes described.

2. Cutters *p p*, hinged to the upturned portions of the cross-bar *H*, and adjustably connected to the auger-shaft *E* by means of rigid arms *m m*, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

Witnesses: FRANCIS S. BURT.
A. T. BROOKS,
J. W. TRIMBLE.