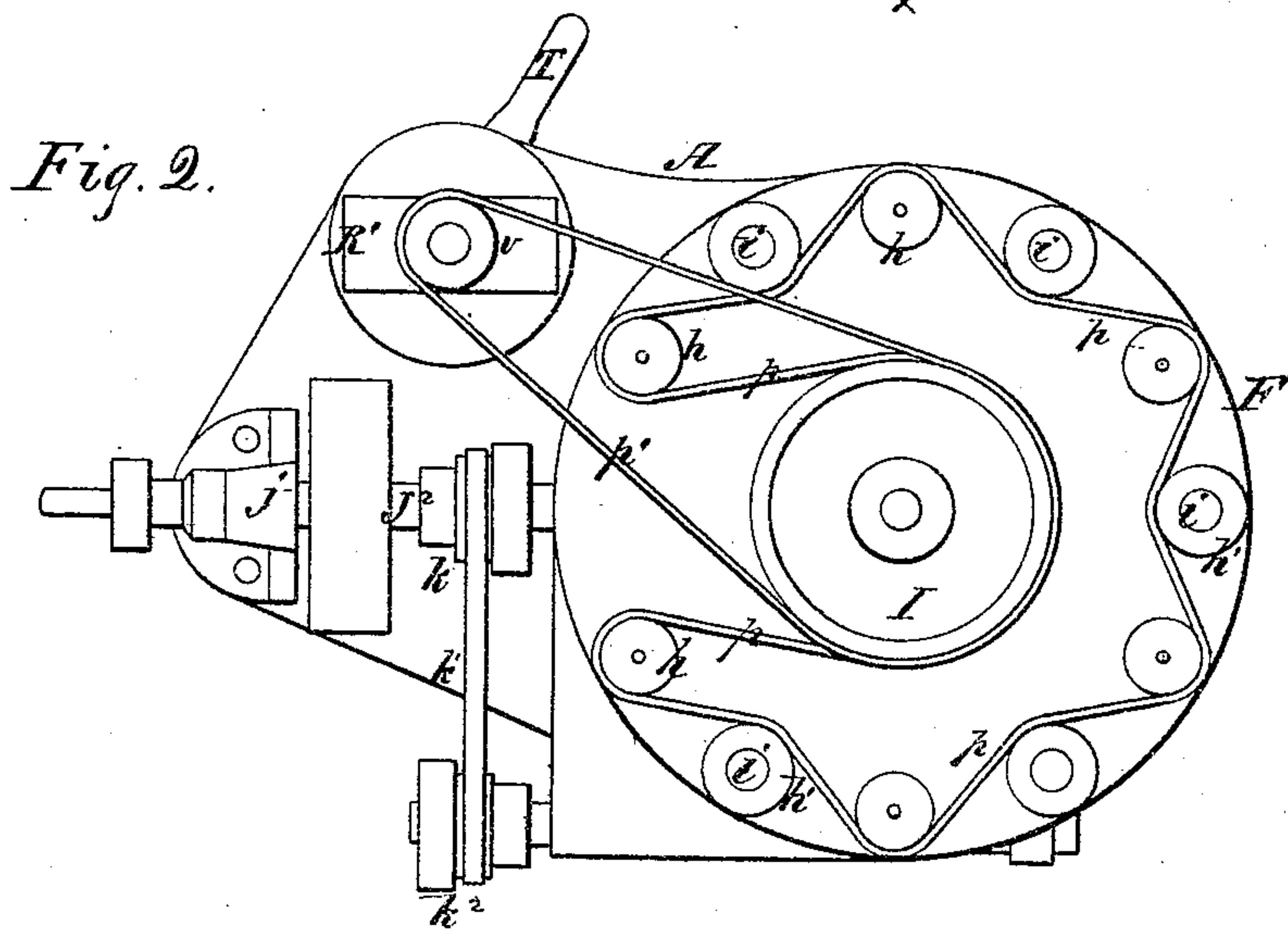
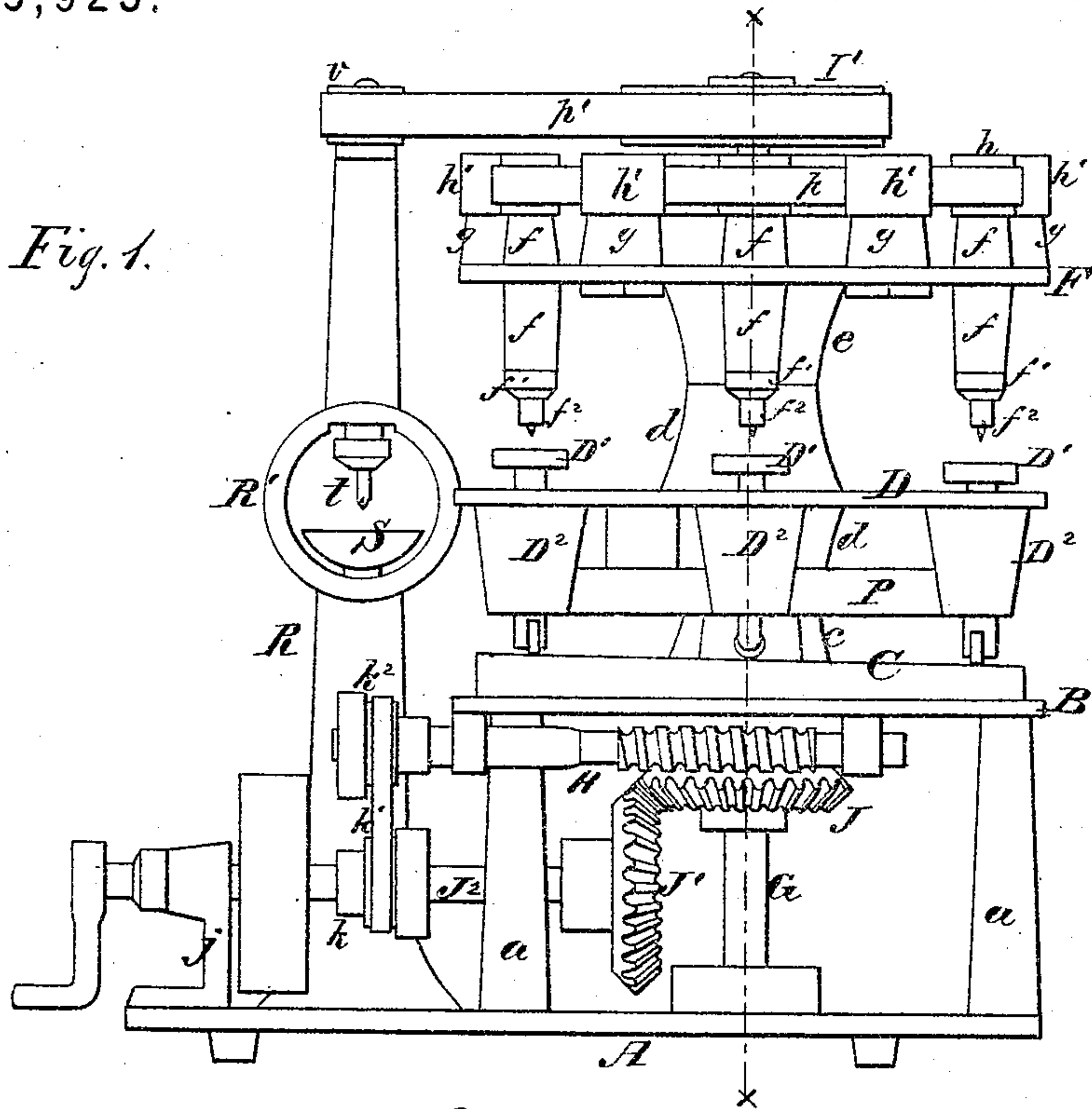


**A. WOODWORTH.**  
**Metal-Drilling Machines.**

No. 145,923.

Patented Dec. 23, 1873.



WITNESSES.  
*Mary J. Utley.*  
*George E. Plam.* By

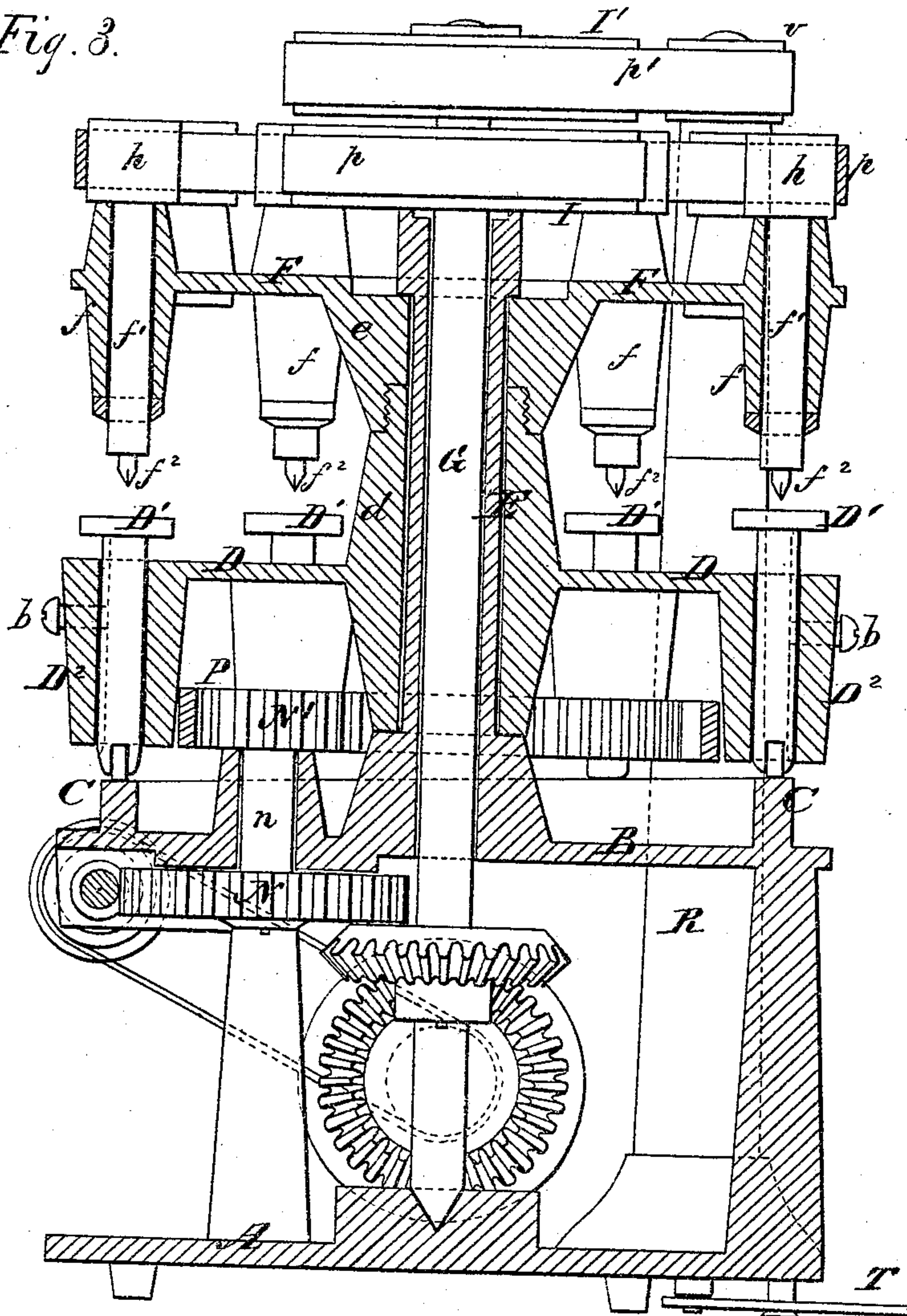
INVENTOR.  
*Alfred Woodworth*  
*Chipman & Co.*  
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Fig. 3.



WITNESSES.

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George E. Upham.

By

INVENTOR.

Alfred Woodworth  
Chipman and Fosmum & Co.

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# UNITED STATES PATENT OFFICE.

ALFRED WOODWORTH, OF CAMBRIDGE VILLAGE, NEW YORK.

## IMPROVEMENT IN METAL-DRILLING MACHINES.

Specification forming part of Letters Patent No. **145,923**, dated December 23, 1873; application filed November 22, 1873.

*To all whom it may concern:*

Be it known that I, ALFRED WOODWORTH, of Cambridge Village, in the county of Washington and State of New York, have invented a new and valuable Improvement in a Drill for Iron; 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 front view of my gang-drill. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view of the same.

This invention relates to improvements on machinery for drilling harvesting-machine guards and other objects. It consists, first, in the construction and arrangement of the spindle-carrying plate, work-bed table, and hollow fixed post, used in connection with operating mechanism; second, in a novel construction and arrangement of the frame and driving mechanism for drills, which are arranged in a circle, and which revolve around a central axis, as will be hereinafter explained.

The following is a description of my improved gang-drill.

In the annexed drawings, A represents the horizontal bed or foundation of the machine, from which rise three posts, *a*, that support a plate, B. C is a circular camway or inclined plane for lifting the work up to the drills. D is a circular table, which turns around a tubular post, E, and which is supported by its central hub *d* upon an elevation, *c*, rising from the center of the plate B. *D*<sup>1</sup> *D*<sup>1</sup> are the work-beds, which are arranged concentric to the vertical axis of the table D, and are constructed upon the upper ends of stems that pass vertically through pendent posts *D*<sup>2</sup>. The stems of the work-beds are supported upon the camways C by means of anti-friction rollers, and these stems are prevented from turning about their axes by means of set-screws *b*, which are tapped through the posts *D*<sup>2</sup>, and enter grooves in the stems. The upper end of the hub *d* of the table D is rigidly connected to the hub *e* of a circular drill-carrying plate, F, so that this plate and the table D will turn together around the tubular post E. The plate

F is constructed with vertical tubular bearings *f g*. The bearings *f* receive through them the spindles *f*<sup>1</sup> of the drills *f*<sup>2</sup>, on the upper ends of which spindles small belt-drums *h* are keyed. The bearings *g* have fixed into them studs *i*, on which belt-drums *h'* turn freely. The axes of the spindles *f*<sup>1</sup> coincide with the axes of their respective work-beds, and the drills *f*<sup>2</sup> are removably secured into the lower ends of these spindles. G represents a shaft, which is stepped into the base-plate A, and which extends up through the tubular post E, and has two belt-wheels, I I', keyed on its upper end. Below the plate B a bevel spur-wheel, J, is keyed on the shaft G, which engages with the teeth of a bevel-wheel, J<sup>1</sup>, on a horizontal shaft, J<sup>2</sup>. This shaft J<sup>2</sup> is mounted in bearings *j* on the bed-plate A, and has belt-pulleys *k* keyed on it of different diameters. H represents a horizontal worm-screw shaft, which is borne by hangers depending from the plate B, and which receives rotation from the main driving-shaft J<sup>2</sup>, by means of the pulley *k*, a belt, *k*<sup>1</sup>, and a pulley, *k*<sup>2</sup>. The screw-thread on shaft H engages with the teeth of a wheel, N, which is keyed on a shaft, *n*, that passes vertically through the plate B, and has a pinion spur-wheel, N', keyed on its upper end. The pinion N' engages with the teeth of an inside gear-ring, P, which is rigidly secured to bosses formed on the bottom of the table D. The spindles receive rotation from the belt-wheel I by means of an endless belt, *p*, which is passed around this wheel, and around the pulleys *h h'*; and the table D, with its spindle-carrying-plate F, are rotated together by means of the worm-screw shaft H, and wheels N N', and gear-ring P. R designates a vertical post, which rises from the bed-plate A, and which is hollow. The upper and lower portions of this post are connected by a vertical ring, R', in which is a work-bed, S, and a drill, *t*. The work-bed is on the upper end of a rod, which can be moved up and down by means of a foot-lever, T, and the drill *t*, which is for counter-sinking, is fixed into the lower end of a spindle carrying on its upper end a small pulley, *v*. The spindle of drill *t* receives rotation from the wheel I' by means of a belt, *p'*.

When the main shaft J<sup>2</sup> is rotated, motion will be communicated to all the drill-spindles.

At the same time the spindles  $f^1$  and their work-beds  $D^1$  will revolve slowly around the central tubular post E. The attendant will be stationed on that side of the machine where the highest part of the camway terminates and the lowest part thereof commences; and as the drills successively move around to such point, and the work-beds are allowed to drop, the drilled work is removed, and undrilled work applied in its place.

The drilled work is then applied on the bed beneath the drill  $t$ , and the holes are countersunk by pressing with the foot upon the lever T.

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

1. The spindle-carrying plate F and work-bed table D, applied to revolve around a hol-

low fixed post, E, in combination with the shaft G, wheel I, and a belt,  $p$ , which is applied around the spindle-pulleys  $h$  and idler-pulleys  $h'$ , substantially as and for the purposes explained.

2. The worm-screw H, receiving motion from the same shaft which gives motion to the center shaft G, in combination with the wheels N N', gear-ring P, table D, and drill-carrying plate F, substantially as and for the purposes described.

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

ALFRED WOODWORTH.

Witnesses:

B. P. CROCKER,  
R. KING CROCKER.