

M. A. FURBUSH.
Metal Drilling-Machines.

No. 150,857.

Patented May 12, 1874.

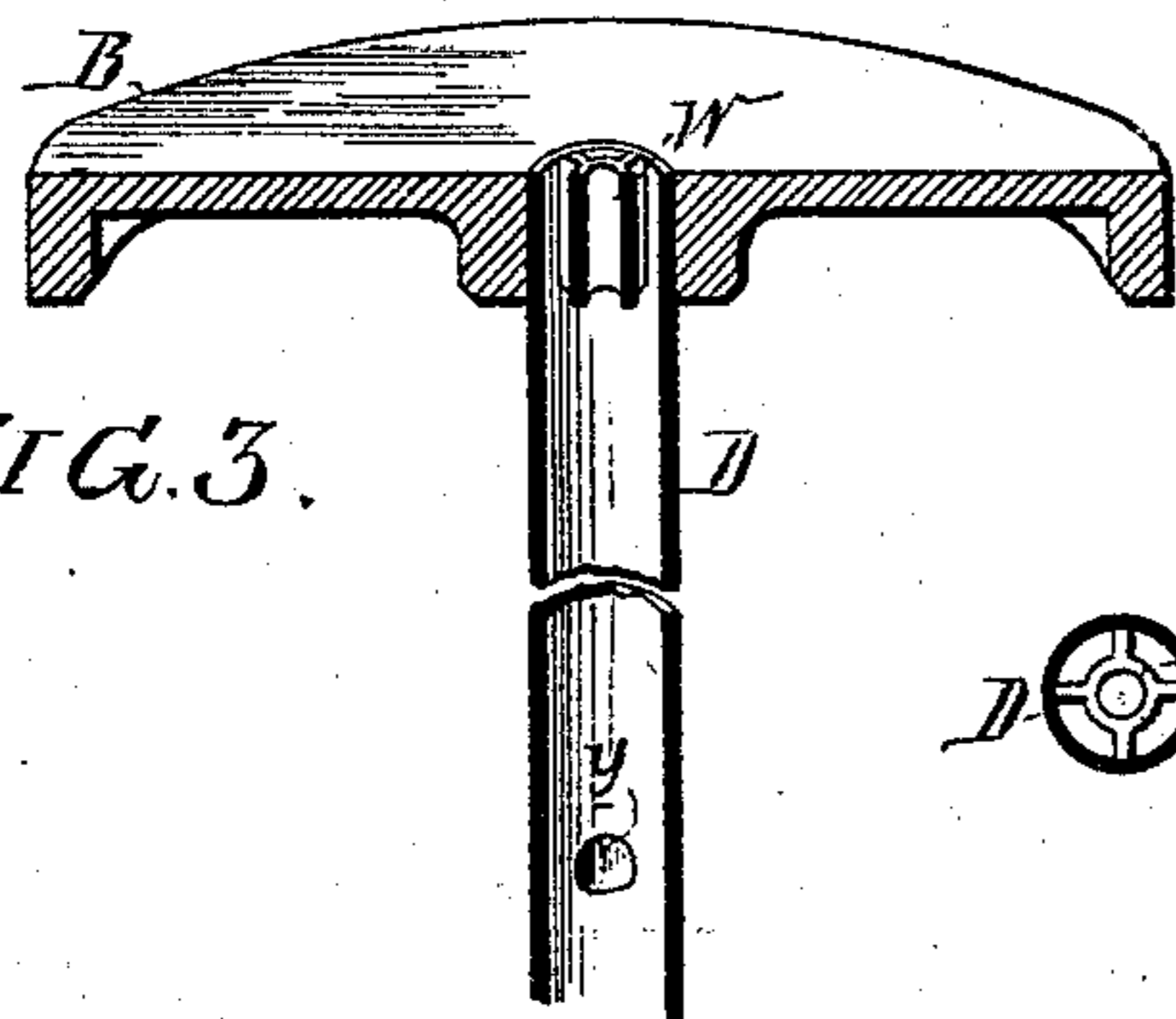
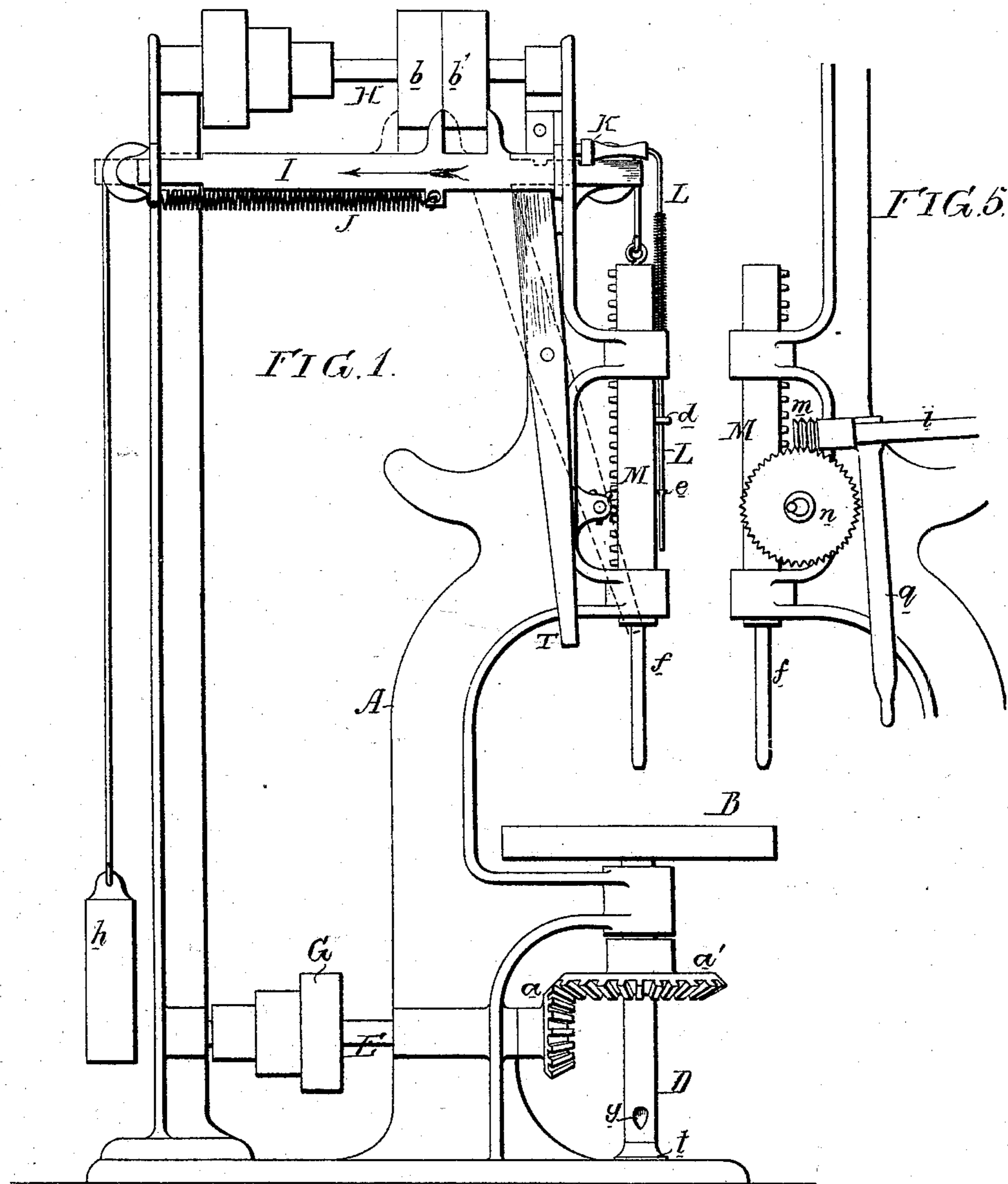


FIG. 3.

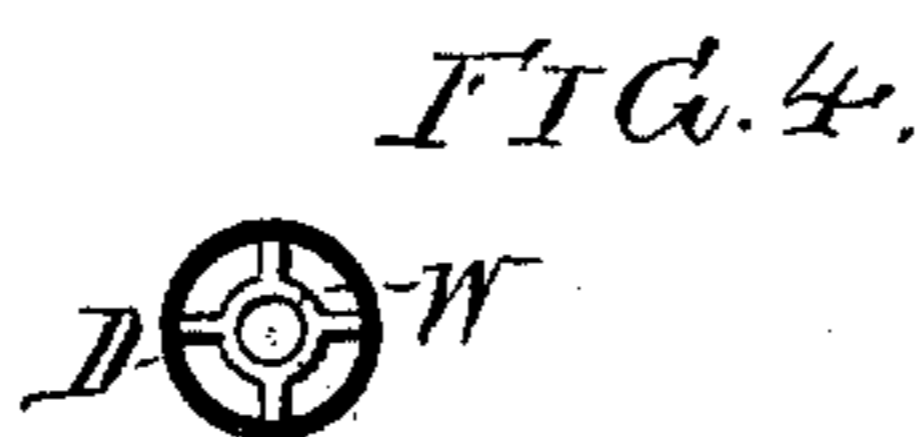


FIG. 4.

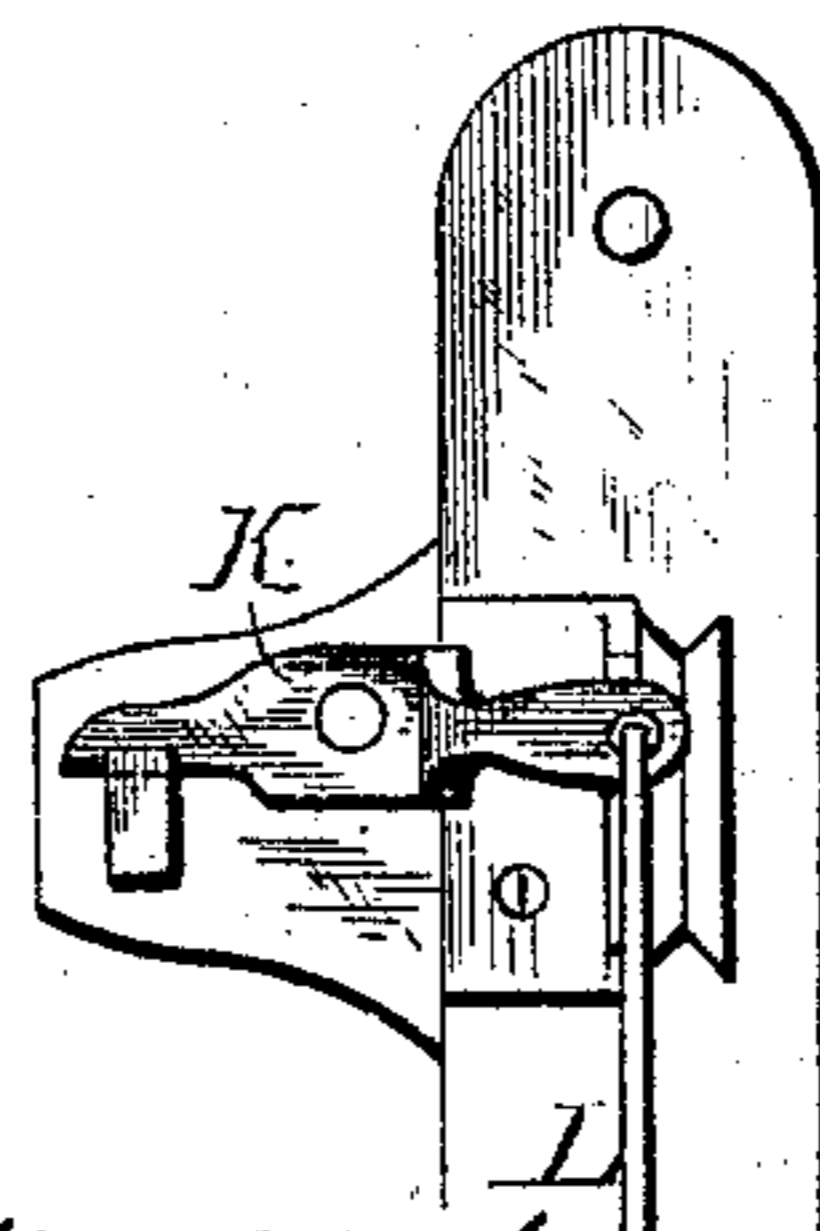


FIG. 5.

Witnesses, Hubert Howson
 Thomas McIlwain

M. A. Furbush
 by his attys.
 Howson and Son.

UNITED STATES PATENT OFFICE.

MERRILL A. FURBUSH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND C. A. FURBUSH, OF SAME PLACE.

IMPROVEMENT IN METAL DRILLING-MACHINES.

Specification forming part of Letters Patent No. **150,857**, dated May 12, 1874; application filed April 24, 1874.

To all whom it may concern:

Be it known that I, MERRILL A. FURBUSH, of Philadelphia, Pennsylvania, have invented an Improvement in Drilling and Boring Machines, of which the following is a specification:

The objects of my invention are, first, to automatically prevent the boring-tool of a drilling-machine from cutting to a greater depth than is required; and, second, to so effectually dispose of the borings that they shall not interfere with the proper bearing of the drill-spindle in the face-plate. These objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a side view of a drilling-machine with my improvements, and Figs. 2, 3, 4, and 5 detached views.

D is a vertical spindle, turning above in a projection on the frame, and below in a step, *t*, and carrying the face-plate B, this spindle being tubular, excepting at or near its lower end and where it fits into the step *t*, and being driven from a shaft, E, through the medium of bevel-wheels *a a'*. The shaft E has a cone-pulley, G, corresponding with that on a counter-shaft, H, which turns in bearings at the top of the frame, and has a loose pulley, *b*, and fast pulley *b'*. A belt-guide, I, is arranged to slide in the frame, and is connected to the latter by a spring, J; and one arm of the lever K, hung to the frame as shown in Fig. 2, is adapted to a notch in the said belt-guide, the other arm being connected to a vertical rod, L, which passes through an eye, *d*, in the vertical bar, the said rod having an adjustable collar or stud, *e*, with which the eye comes in contact, under the circumstances and with the result explained hereafter.

It may be remarked that the bar M, to which the drill-spindle *f* is attached, can slide freely in its bearings, but cannot turn therein—that is, it is balanced by a weight, *h*—and that it can be raised or lowered by hand or automatically, the feed-motion consisting, in the present instance, of a feed-shaft, *i*, deriving its motion from the shaft E, and having a worm, *m*, gearing into a worm-wheel, *n*, on a shaft carrying

a pinion which gears into a rack at the back of the drill-bar.

The worm can be thrown out of gear with the worm-wheel by manipulating the lever *q*, and thereby elevating that end of the feed-shaft to which the worm is attached, the bearings of this shaft being so connected to the frame as to permit this movement.

It is important that the downward movement of the drill-rod should be arrested when it has passed through the work, and before it can come in contact with the face-plate, a duty which is usually accomplished by an attendant, who arrests the feed-motion at the proper time. In my improvement, however, this duty is effected automatically, either by arresting the feed-motion or by stopping the machine itself, a duty accomplished in the following manner: When the eye on the bar M comes in contact with the stud *e* on the rod L it depresses the latter, operates the lever K, and releases the belt-guide I, which, by the aid of the spring J, moves the driving-belt from the fast to the loose pulley.

This belt-guide can, when necessary, be operated by hand through the medium of a lever, T, in a manner which needs no description.

This automatic arresting mechanism will enable one man to attend two, three, or four drilling-machines, as his attention is not distracted by the requirements of other machines of this class, as regards the arresting of the downward movement of the drill-spindle.

The arresting mechanism may be applied to the belt feed-motion in a manner which needs no explanation; but I prefer to arrest the movement of the machine itself at the proper time.

It is usual in drilling-machines of this class to make a central opening in the face-plate B, as a lower bearing for the drill-rod *f*, a bearing which is liable to be interfered with by the borings which accumulate on the face-plate. In order to remedy this evil, I make the vertical spindle of the face-plate tubular, excepting at the lower end, where it turns in the step *t*; and into that portion which passes through and is secured to the face-plate I fit the piece W, which is represented in Fig. 4,

and which consists of a central ring and any desired number of arms. When fitted into its place this ring affords a proper bearing for the drill-rod, and a number of openings are presented, through which the borings can pass into the interior of the spindle D to be discharged therefrom through a lateral opening, *y*.

I claim as my invention—

1. The combination of the drill-bar M, its eye, *d*, the arresting-rod L, and its stud *e*.
2. The tubular spindle D, having at the top,

where it carries a face-plate, a ring, W, with projections, and a lateral opening, *y*, above its lower solid end, which is adapted to the step *t*, all as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

M. A. FURBUSH.

Witnesses:

WM. A. STEEL,
HARRY SMITH.