3. Sheets. Sheet. 1.

A. J. Truxell,

Boring Wood.

No. 109078. Patented Nov. 8. 1870.

Fig 1.

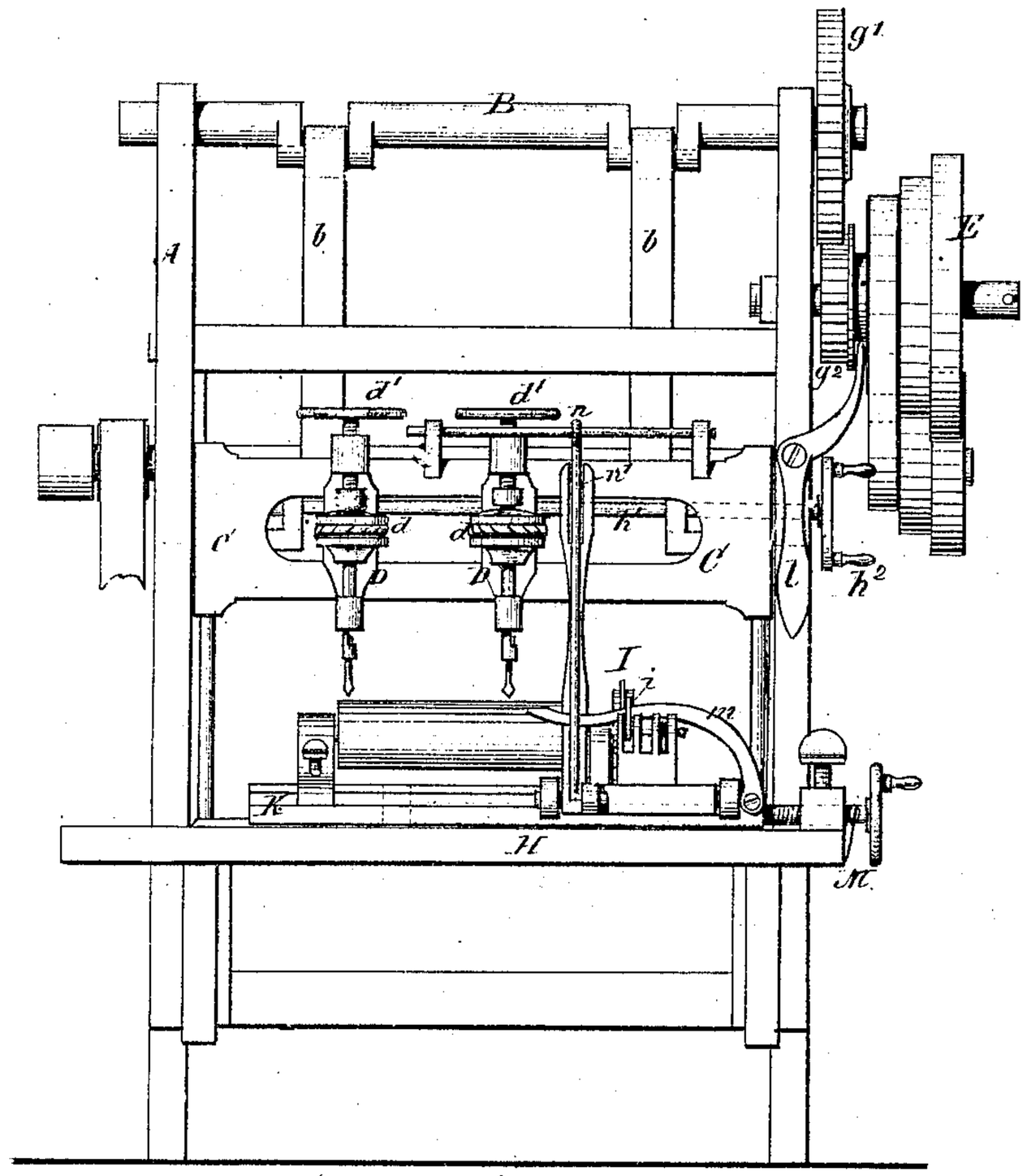
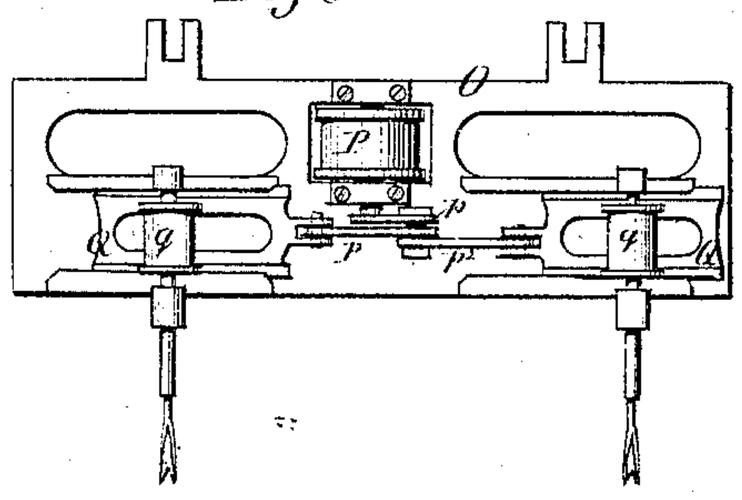


Fig 3



Witnesses:

C. H. Fitch

Fred. Knoop

Inventor:

A. J. Truxell

per Baxter & Hagmann

Attorneys.

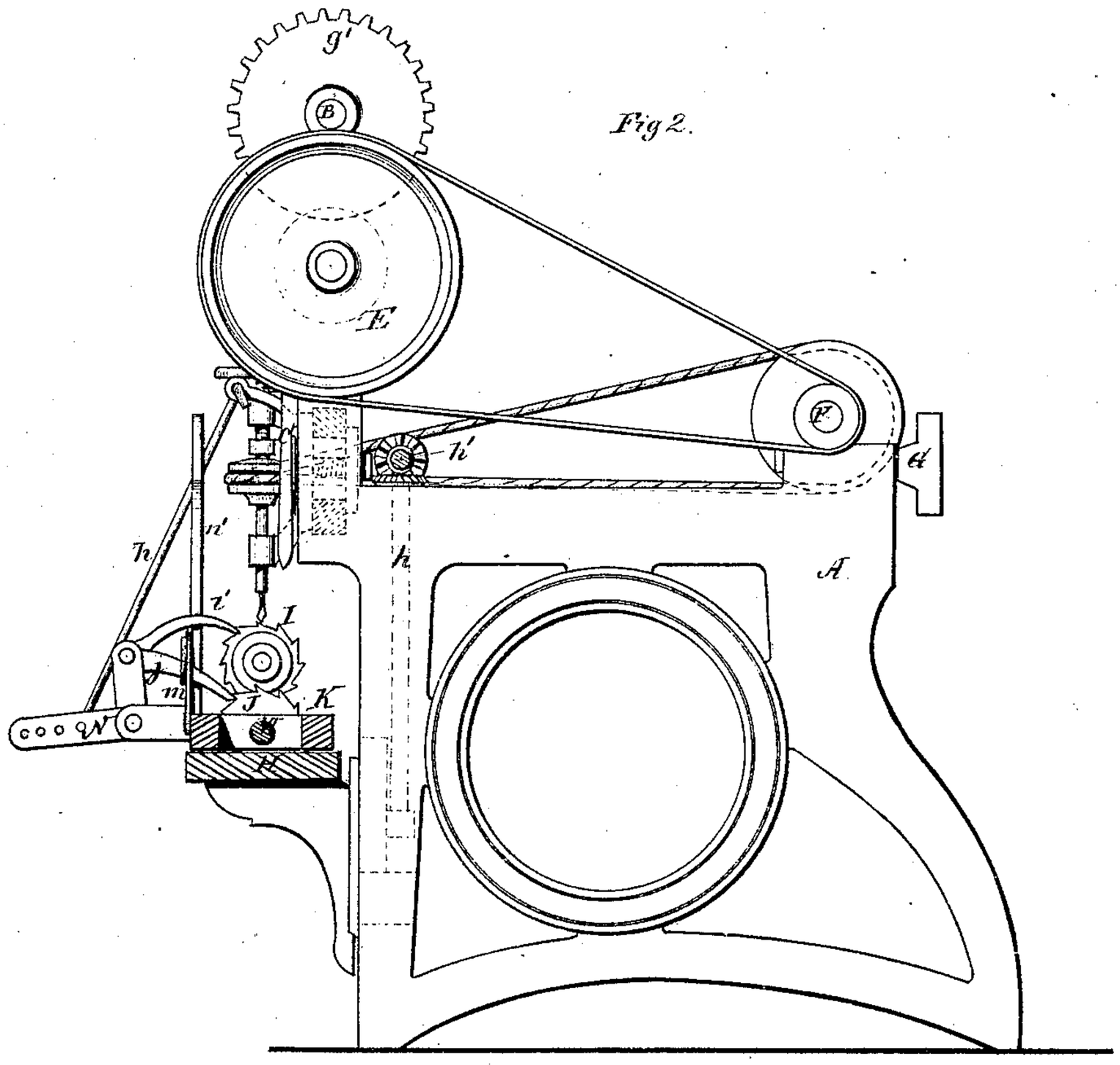
3 Sheets. Sheet 2.

A. J. Truxell,

Boring Wood.

No. 109,078. Patented Nov. 8. 1870.

Fig 2.



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C. H. Fitch

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Inventor:

A. J. Truxell

per Baxter & Hagmann

Attorneys.

A. J. Truxell, 3. Sheets. Sheet. 3.

Boring Wood.

No. 109,078. Patented Nov. 8. 1870.

Fig 4

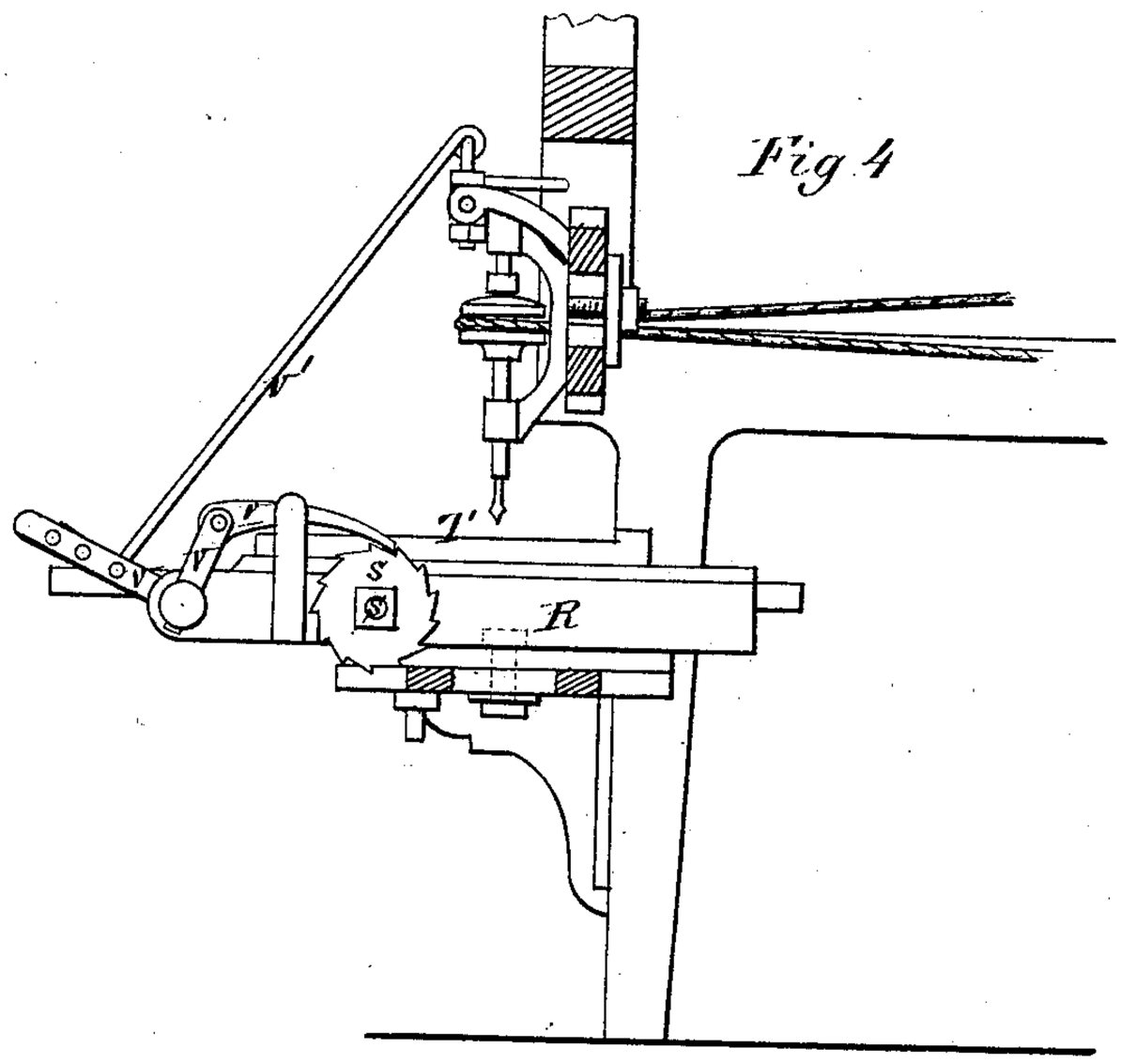


Fig 5.

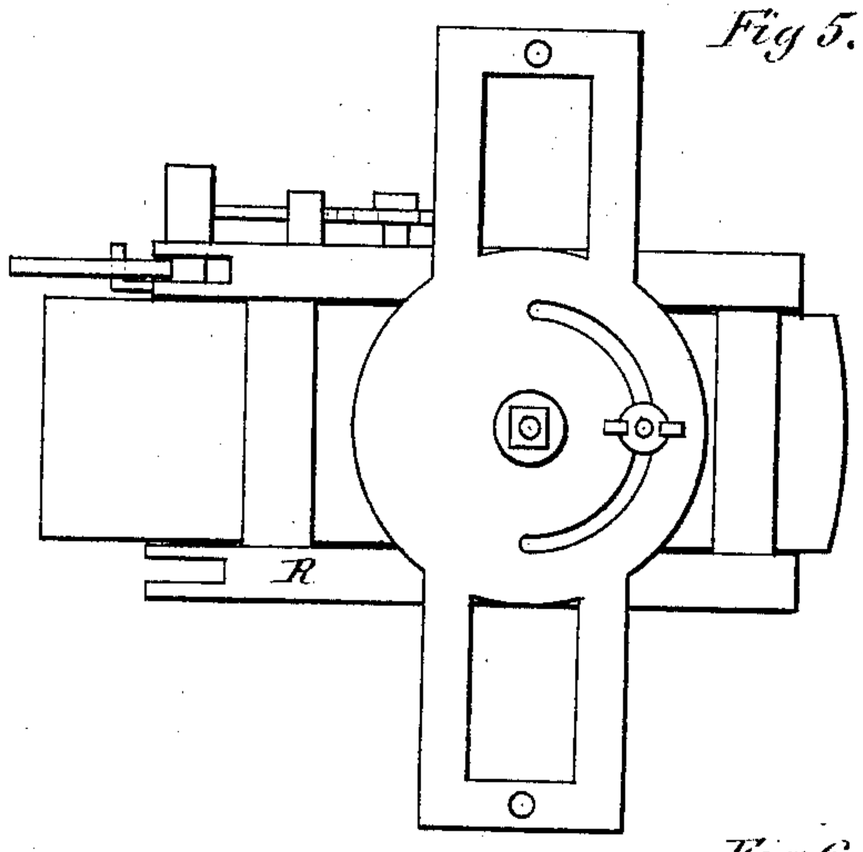
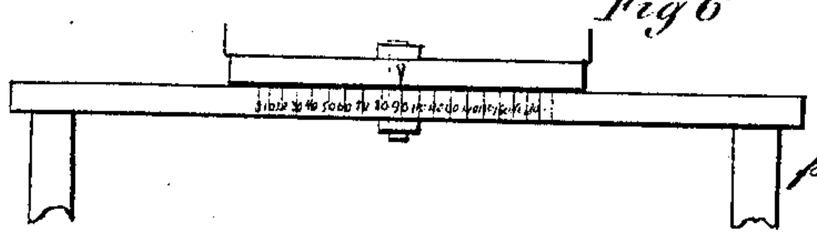


Fig 6



Witnesses:
C. H. Fitch.
Fred. Knoop.

Inventor:
A. J. Truxell
per Baxter & Hagman
Attorneys.

UNITED STATES PATENT OFFICE.

ANDREW J. TRUXELL, OF LYNCHBURG, VIRGINIA.

IMPROVEMENT IN BORING-MACHINES.

Specification forming part of Letters Patent No. **109,078**, dated November 8, 1870.

To all whom it may concern:

Be it known that I, ANDREW J. TRUXELL, of Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Automatic Drilling, Boring, and Mortising Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, sufficient to enable those skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings, making part of this specification, in which--

Figure 1 is a front view of my improved machine. Fig. 2 is a side view of the same. Fig. 3 is a front view of a mortising device. Fig. 4 is an end view of a carriage and platform hereinafter particularly referred to. Fig. 5 is a bottom view of the same. Fig. 6 is a front view of a device hereinafter particularly referred to.

The nature of my invention consists in a peculiar construction and arrangement of parts whereby a series of holes may be drilled in a cylinder or plane surface and the positions of the holes with relation to each other automatically regulated; also, providing the machine with a boring and mortising device and with an adjustable platform for drilling or boring at any desired angle.

The frame A may be made of either wood or metal, as desired. In the upper part, in front, is journaled a crank-shaft, B, connected by pitmen *b* to a frame, C, which reciprocates vertically in guides in the frame A. In the frame C are journaled one or more bit-holders, D, provided with grooved pulleys *d* for driving them, and with set-screws *d'* for raising or lowering them. On one end of the crank-shaft B is a gear-wheel, *g'*, and just below this is another gear-wheel, g^2, on the same shaft with a pulley, E, from which passes a belt to a pulley on the end of a shaft, F, in the rear upper portion of the frame A. The gear-wheels g' g^2 are thrown in and out of gear by means of a lever, *l*, pivoted to the front portion of the frame A. The shaft F may be provided with either grooved pulleys or a drum, from which pass belts to the grooved pulleys *d* on the bit-holders. Set-screws G are provided for tightening the belts which pass over the drum and pulleys. In the front part of the frame A is a platform, H, on which rests a sliding carriage, K. The platform H may be raised and lowered by means of screw-shafts *h*, passing through screw-lugs attached to the platform, and operated by miter-gearing on a horizontal shaft, *h'*, turned by a crank, h^2. The carriage K is provided with suitable boxes for the journals of the cylinder to be drilled. On one of these journals is a ratchet, I, operated by a pawl, *i*. This ratchet is made double—that is to say, there are two ratchets placed side by side, so that one tooth of one ratchet lies between two teeth of the other. The ratchets are separated by a thin circular metallic plate, which has a depression formed in it to allow the pawl *i* to be changed from one ratchet to the other. In one of the end pieces of the carriage K is a hole formed with a screw-thread, and through this passes a screw-shaft, M, on the inner end of which is a ratchet, J, operated by a pawl, *j*. The pawls *i* and *j* are pivoted in the short arm of an elbow-lever, N, attached to the front of the carriage, and the long arm of which is connected with the sliding frame C by a pitman, *n*, which is held in place by a forked upright bar, *n'*. A curved bar, *m*, has one end pivoted to the right-hand front end of the carriage, and the other rests upon pins projecting from the forked bar *n'*. The pawl *i* rests upon the upper edge of the curved bar *m*, and the pawl *j* passes through a loop or staple attached to the lower edge.

The portion of my invention thus far described is peculiarly adapted to the drilling of cylinders for the cockle and garlic separator for which Letters Patent of the United States were granted to J. W. Neal and myself on the 9th day of October, 1868.

The operation is as follows: The gear-wheels g' g^2 being in gear and the belts properly adjusted, motion is imparted to the crank-shaft B and the shaft F. The cylinder to be drilled being in place on the carriage, the bits or drills come in contact with it as the crank-shaft and pitmen force down the frame containing the bit-holders, while the belts from the drum or pulleys on the shaft F cause the bits or drills to revolve with sufficient velocity to drill the holes, the depths of the holes being regulated by the set-screws *d'* at the pleasure of the operator without stopping the machine. As the revolution of the crank-shaft raises the frame C and withdraws the drills or bits from the cylinder, the long arm of the lever N is ele-

vated, and the pawl I turns the ratchet a distance of one tooth or more, (according to the adjustment of the rod *n* in the lever N,) so that when the drills again descend they come in contact with the cylinder at points farther around on its periphery than the holes previously drilled, while at the same time the pawl *j* moves the ratchet J a distance equal to one tooth or more, which movement causes the carriage and cylinder to slide toward the left-hand side of the machine, so that the next series of holes are more toward the right-hand end of the cylinder than the preceding ones, and so on until the cylinder has made a complete revolution, when it is found that the holes in the cylinder lie in alternate rows—that is to say, one hole in each row lies midway between two holes of the row on each side of it.

When it is desired to not use the pawls, they may be released from the ratchets by raising the curved bar *m* and resting it upon one of the pins projecting from the bar *n'*.

The boring and mortising device is shown in Fig. 3, Sheet 1. It consists of a frame, O, which slides vertically in the frame A in the same manner as does the frame C, and is connected with the crank-shaft B in the same manner. Midway between the ends is a pulley, P, driven by a belt from the shaft F. On the shaft of the pulley P is a crank, *p*, which is connected by pitmen p' p^2 to two frames, Q, which slide horizontally in the frame O in suitable guides—one near each end. In the frames Q are fixed bit-holders, provided with pulleys *q* in a similar manner to those in the frame C. As the pulley P revolves the crank causes the frames Q to reciprocate back and forth, carrying the bits with them; and as the bits are rapidly revolved by the belts passing around their pulleys, they cut and bore at the same time, forming mortises, the length of which may be regulated by the length of the crank *p* and pitmen p' p^2.

The adjustable platform is shown in Sheet 3, Figs. 4, 5, and 6. It is attached to the frame A in a similar manner to that in which the platform H is attached. The portion upon which the carriage rests is pivoted so as to turn like a railroad turn-table. Running transversely through the movable portion R is a shaft, S, having a pinion about midway of its length projecting up through a slot, so as to engage with a rack on the bottom of the carriage T. On the end of the shaft S is a ratchet, *s*, operated by a pawl, *v*, attached to an elbow-lever, V, which is connected by a rod, *v'*, to the bit-frame in a similar manner to that hereinbefore described, except that the upper end of the rod *v'* is attached to a knuckle-joint, which is arranged to slide horizontally.

The operation is as follows: When it is desired to bore holes at different angles, instead of parallel rows, the movable portion R of the platform is turned to the right or left, as desired, the angle being ascertained by a pointer and scale (shown in Fig. 6) arranged at the front edge of the platform. As the drills are elevated in the manner hereinbefore described, the pawl *v* turns the ratchet *s*, and, through the rack and pinion, moves the carriage forward. The sliding knuckle-joint allows the rod *v'* to operate the pawl when the movable portion of the platform is in different positions.

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

1. The combination of the ratchet I, pawl *i*, lever N, rod *n*, and sliding frame C, for turning the cylinder, substantially as shown and described.

2. The combination of the ratchet J, pawl *j*, lever N, rod *n*, and sliding frame C, for moving the cylinder longitudinally, substantially as shown and described.

3. The upright forked bar *n'*, arranged as shown and described, for the purpose specified.

4. The curved bar *m*, arranged as shown and described, for the purpose specified.

A. J. TRUXELL.

Witnesses:
C. H. FITCH,
FRED. KNOOP.