(No Model.)

3 Sheets—Sheet 1.

A. W. KINNEY.

DRILLING MACHINE.

No. 558,497. Patented Apr. 21, 1896.

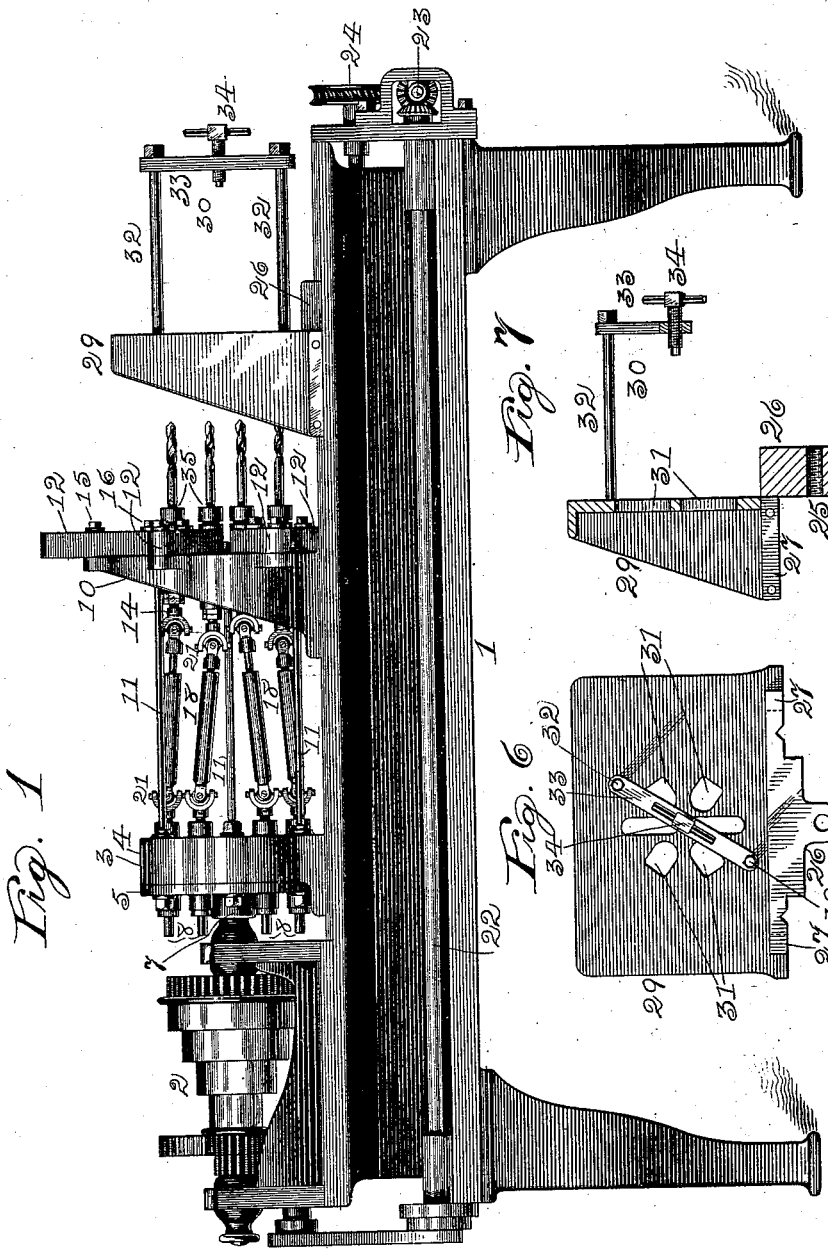

Fig. 1

Fig. 7

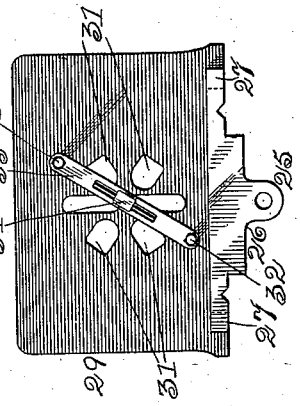

Fig. 6

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P. A. Phelps.

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A. W. KINNEY.

DRILLING MACHINE.

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Fig. 3

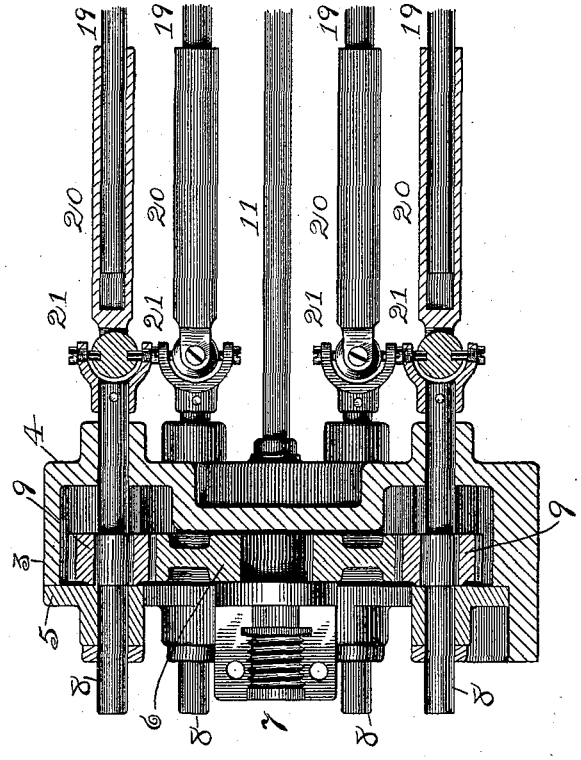
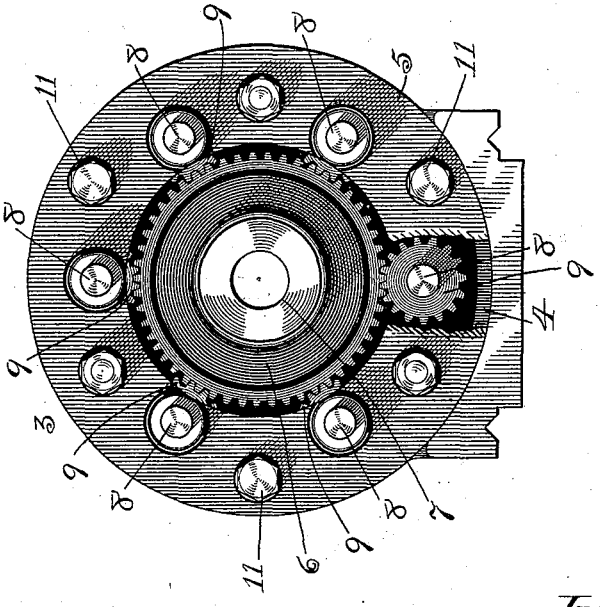


Fig. 2



Witnesses;
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(No Model.) 3 Sheets—Sheet 3.

A. W. KINNEY.

DRILLING MACHINE.

No. 558,497. Patented Apr. 21, 1896.

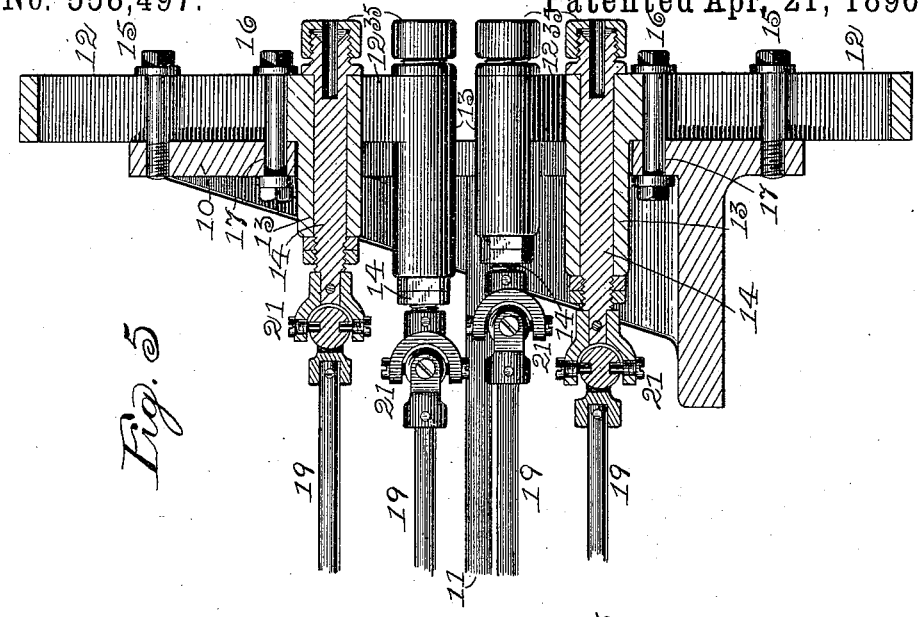

Fig. 5

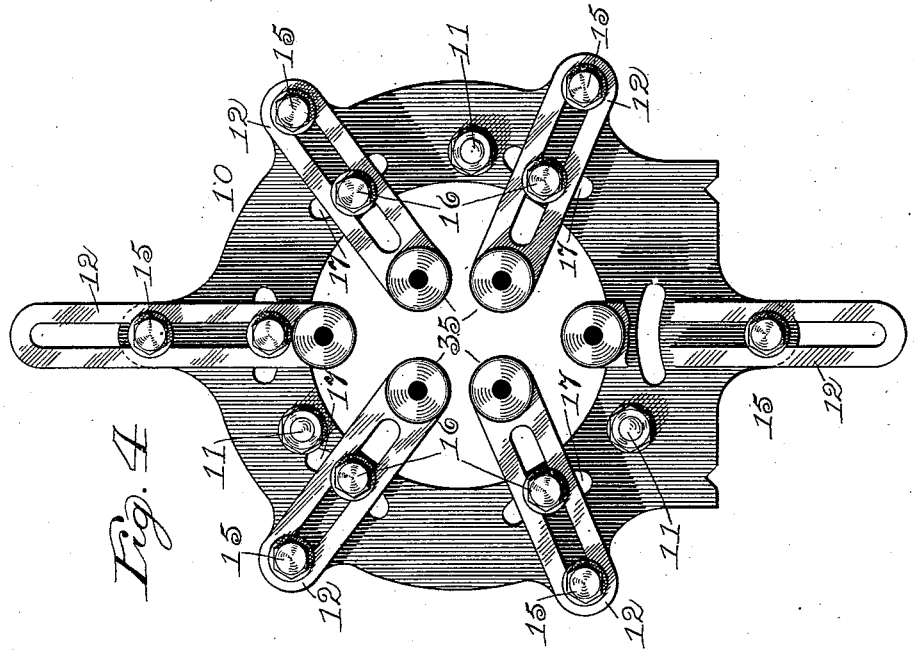

Fig. 4

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UNITED STATES PATENT OFFICE.

ALFRED W. KINNEY, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE PRATT & WHITNEY COMPANY, OF SAME PLACE, AND AUGUSTE J. OEHRING, OF CHICAGO, ILLINOIS.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 558,497, dated April 21, 1896.

Application filed July 5, 1892. Serial No. 438,880. (No model.)

To all whom it may concern:

Be it known that I, ALFRED W. KINNEY, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a full, clear, and exact specification.

The invention relates to the class of machines provided for tapping, boring, or drilling simultaneously a number or group of holes, sockets, or perforations in plates or other articles; and the object is to provide a simple and cheap machine of this class in which the position of the taps, augers, or drills or the arrangement of their number and size can be easily and quickly adjusted to operate in the desired manner on any structure within the limits of the capacity of the machine.

Referring to the accompanying drawings, Figure 1 is a side elevation of a machine embodying the invention. Fig. 2 is a face view, looking from the head-stock, of the head bearing the driving mechanism for the multiple spindles. Fig. 3 is a vertical section through this head. Fig. 4 is a face view looking from the tail of the machine, of the head bearing the adjustable chucks. Fig. 5 is a vertical section of the same. Fig. 6 is a face view of the work-holding carriage, and Fig. 7 is a vertical section of the latter.

In the views, 1 indicates a lathe-bed of ordinary form and construction, having a head-stock 2 with the usual live-spindle, driving-cone, back and feed gears common in machines of this class.

Supported on the shears of the lathe near the head-stock is a head 3, preferably consisting of a hollow circular casting 4 and a circular plate 5, that hold between them a gear 6, having a hub with a chuck 7, adapted to be coupled with the live-spindle of the head-stock. Any desired number of fixed bearings are formed in this casting and plate, and in these turn spindles 8, that bear pinions 9 in mesh with the central gear 6. At a distance from this head, which holds the spindles driving mechanism, the shears of the bed support an annular head 10, that is preferably connected so as to be rigid with the head 3 by bolts 11. This head 10 has attached to one face adjustable arms 12, corresponding in number to the spindles 8, and in the inner ends of these arms are formed bearings 13, which hold spindles 14. The arms are preferably slotted and held in place by the pivot-bolts 15, that pass through the slots into the head 10, and by bolts 16, that pass through the slots in the arms, and slots 17 cut through the head on arcs having centers concident with the pivot-bolts, so that the arms may be adjusted radially to the desired position when the bolts are loosened and also may be swung or oscillated on the pivot-bolts to permit of a tangential adjustment of the spindles 14, the ends of which, toward the tail of the bed, are provided with a chuck 35 of any common form for grasping and holding the taps, augers, or drills with which it is intended to operate.

The spindles 8 are each connected with the corresponding spindles 14 by means of the extensible shafts 18, consisting of the telescopic rods 19 and tubes 20, flexible or ball-and-socket joints 21 being used to connect the ends of the shafts 18 with the spindles, to allow free adjustment of the spindles which bear the boring-tools.

The ordinary feed-screw 22, driven by the usual feed from the gears on the live-spindle in the head-stock, is connected by bevel-gears with a worm 23, meshing with a worm-wheel 24 at the tail of the bed, and the shaft of this wheel is provided with a thread that fits a threaded nut 25 on the bottom of the carriage 26, that has a movement in the usual manner upon the ways on top of the bed. To arms 27, that project from this common lathe-carriage, is secured a plate or upright frame 29, having a holding device 30 for securing the piece to be operated upon and openings 31 for the passage of the drills to the work. In the form shown this holding device consists of a pair of bolts 32, united at their outer ends by a yoke 33 in a threaded socket in which turns a set-screw 34, by means of which the work is held with the face to be operated on next the plate in position to receive the drills.

The arms 12, bearing the spindles, can be easily and quickly set by any one into the desired position with relation to each other, and

any desired number of the same or different sizes of drills, augers, or taps may be employed, within the capacity of the machine, for drilling, boring, or tapping the required group of holes, perforations, or sockets in the plate or article which is clamped to the frame 29, borne by the carriage 26. When power is applied to the driving-cone, the live-spindle revolves the gear meshing with the pinions, so that the drills through the spindles and extensible jointed shafts are rotated to operate upon the work which is fed to them by the motion of the carriage that is moved by the feed mechanism described, as is the ordinary engine-lathe carriage.

Any desired number of any convenient size of drills may be employed, which, by means of the simple, cheap, convenient, and readily-operated construction shown, that can be attached to any engine-lathe, may be quickly adjusted by any person to bore a group of holes of any arrangement, size, or number in any article.

I claim as my invention—

1. In combination in a drilling-machine, an annular head bearing arms holding rotary spindles, said arms being held to the head by means of a pivot whereby the spindles may be oscillated toward or from the axis of the head, and a clamp for securing the arms in the desired adjustment, substantially as specified.

2. In combination in a drilling-machine, an annular head bearing arms holding rotary spindles, said arms being provided with longitudinal slots and held to the head by means of pivots which pass through the slots, and clamping-bolts which pass through the slots in the arms and slots in the head whereby the arms have a rotary and oscillatory movement, substantially as specified.

3. In a drilling-machine in combination, a bed supporting a stock with a live-spindle bearing a gear, a head supporting a plural number of shafts bearing pinions in mesh with the gear and a head supporting arms bearing rotary spindles, said arms being held to the head by means of pivots whereby the spindles held by the arms may be oscillated toward or from the axis of that head, with clamps connecting the arms with the head for securing the arms in the desired adjustment, and flexible shafts connecting the pinion-shafts with the spindles borne by the oscillating arms, substantially as specified.

4. In a drilling-machine in combination, a bed supporting a stock with a live-spindle bearing a gear, a head supporting a plural number of shafts bearing pinions in mesh with the gear and a head supporting arms bearing rotary spindles, said arms being provided with longitudinal slots and held to the head by means of pivots which pass through the slots and by clamping-bolts which pass through the slots in the arms and through circular slots in the head whereby the arms may have an oscillatory and a reciprocating movement, and flexible shafts connecting the pinion-shafts with the spindles borne by the oscillating and reciprocating arms, substantially as specified.

5. In a drilling-machine in combination, a bed supporting a stock with a live-spindle bearing a gear, a fixed head supporting a plural number of shafts bearing pinions in mesh with a gear, and a head connected with the fixed head and supporting arms bearing rotary spindles, said arms being held to the head by means of a pivot whereby the spindles held by the arms may be oscillated toward and from the axis of that head, with clamps connecting the arms with the head for securing the arms in the desired adjustment, extensible shafts with flexible joints connecting the pinion-shafts with the spindles borne by the oscillating arms, a frame movably supported by the bed, a work-holding device connected with the frame, and a feed-screw rotated from the live-spindle and connected with the frame for feeding the same, substantially as specified.

ALFRED W. KINNEY.

Witnesses:
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ARTHUR H. BRONSON.