

(No Model.)

2 Sheets—Sheet 1.

A. D. QUINT.
DRILLING MACHINE.

No. 463,790.

Patented Nov. 24, 1891.

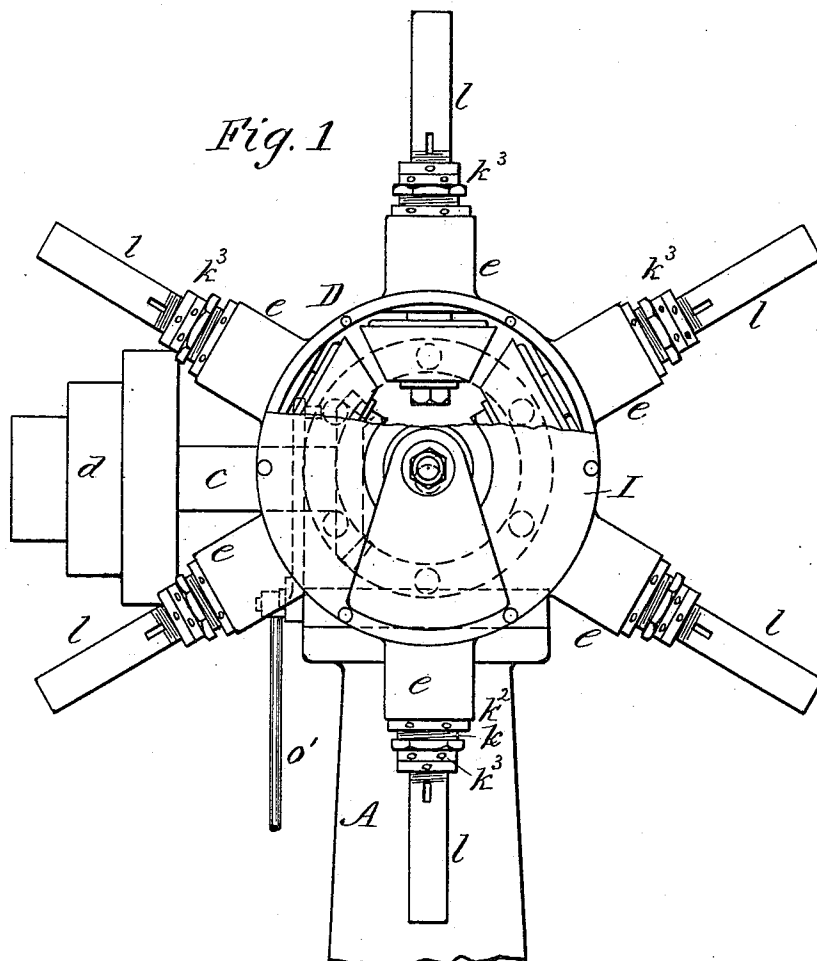
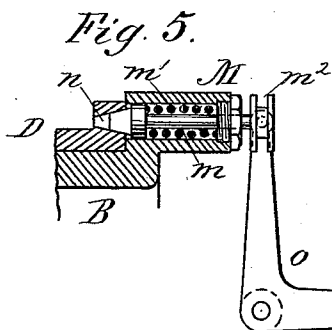
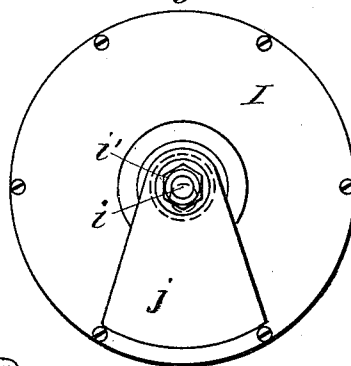


Fig. 4.



Witnesses:

W. B. Jenkins.
H. A. Giddings

Inventor:

Alanson D. Quint.
By Simonds & Burdett,
attys.

2 Sheets—Sheet 2.

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W. B. Jenkins.
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Inventor:
74 Alanson D. Quint,
Simonds & Burdett,
attys.

UNITED STATES PATENT OFFICE.

ALANSON D. QUINT, OF HARTFORD, CONNECTICUT.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,790, dated November 24, 1891.

Application filed July 2, 1891. Serial No. 398,217. (No model.)

To all whom it may concern:

Be it known that I, ALANSON D. QUINT, of 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 description, whereby any one skilled in the art can make and use the same.

My invention relates to the class of machine-tools that are used for drilling or cutting either metal or wood; but it is particularly adapted for use on drilling-machines.

The object of my invention is to provide a drilling-machine that shall support in operative relation to a common driving-spindle a plural number of drill-spindles that may be thrown into or out of engagement with the main driving-spindle at will, so that the machine will have all of the advantages of a gang-drill, although but a single drill will be in use at any one time for the purpose of boring holes in the work.

To this end my invention consists in the details of the several parts making up the drilling-machine as a whole and in the combination of such parts, as more particularly hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a detail view in front elevation of the upper part of a drilling-machine embodying my invention. Fig. 2 is a detail view in side elevation of the machine-head with parts cut away to show construction. Fig. 3 is a detail view in side elevation of the top of the standard and of the turret-head. Fig. 4 is a detail view in front elevation of the turret-head plate. Fig. 5 is a detail view in section of the turret-head lock, showing the bell-crank lever and end of the trip-rod.

In the accompanying drawings, the letter A denotes a column or standard of an upright drill, this part being of any convenient construction so far as shape and height of the column and details of construction of the work-holding table are concerned, the latter being omitted as not directly pertaining to my invention.

On the upper end of the column A is supported a frame B, preferably cast to shape and having bearings that support a shaft *c*, on which is borne a pulley *d* in convenient

position to be connected by a belt to the counter-shaft or any other suitable source of power, while the inner end of this shaft *c* is provided with a bevel cog-wheel *c'*, that is in mesh with bevel cog-wheels that are supported on the main driving-shafts that extend within the turret-head.

On a hub *b'* on the front of the frame a turret-head D is rotarily supported, and this turret-head has projecting radially from its periphery any desired number of drill-stocks E, the axes of the several drills supported in the turret-head all preferably lying in a plane passed through the turret-head at right angles to the axes of the main driving-spindles. The purpose of this construction is to enable successive drills borne in the drill-stocks to be brought into position, so as to exactly replace either of the preceding tools that has been used for boring or cutting. For instance, if a hole previously drilled is to be reamed out a reamer borne in either of the other drill-stocks may be brought into the precise axial position necessary to enable a hole to be reamed through.

On suitable bearings *b²* in the frame a hollow shaft F extends through the hub and into a chamber in the turret-head. On the rear end of this hollow shaft F there is secured a bevel-gear *f'*, that is in mesh with the gear *c'*, and on the front end of this hollow shaft there is supported within the turret-head a friction driving-wheel H, located near the back of the chamber in the head. A driving-shaft G is likewise supported in the bearings *b²*, and it extends through the hollow shaft F and has secured near its support in the frame a bevel cog-wheel *g'* in mesh with cog-wheel *c'*, and on its front end is secured a frictional driving-wheel H'. The result of this arrangement of the spindle-driving shafts F G is to cause the friction driving-wheels H H' to rotate in opposite directions, so that a cone-shaped pulley borne on the end of either of the drill-spindles will be driven and rotated whenever it is pressed into contact with the bevel-surfaces of the two frictional driving-wheels.

The turret is mounted on the hub on the frame eccentric to the axis of the main driving-shaft, so that the cone-shaped heads on the respective driving-spindles may be by the

rotation of the head thrown into and out of engagement with the driving-surfaces of the friction-wheels II II'. These, relative positions of the several spindles, when in position for use and when out of such position, are illustrated in the sectional view in Fig. 2 of the drawings. The turret-head is held on the hub by means of pointed screws d' , that take into a groove d^2 , formed in a ring set in a socket in the surface of the hub or in a groove formed directly in such surface. The two main shafts F and G are held against endwise play by lock-nuts that fit threaded surfaces on the respective parts on one side of the bearing and by the hub of the cog-wheel resting against the opposite side of the bearing, as shown in Figs. 2 and 3 of the drawings. The chamber in the turret-head is closed by the cover-plate I, having a socket in which a bearing-block i is supported, this having a stem that extends through the cover and provided on the outer end with a nut i' , that serves to hold this block against lengthwise displacement, although allowing it free rotation. A weight j is suspended from this stem, and its office is to hold the eccentric bearing-block in the right position to support and guide the end of the driving-spindle that rests in a socket therein, and it also relieves the hollow shaft from any friction or from any work in acting as a support and bearing for the shaft and allows the turret-head to be freely revolved around the bearing-shafts and the disk. Each of the drill-stocks, that may be integral projections from the periphery of the head, as shown, or separate fixtures therein, contains a tubular sleeve k , that forms a bearing for each drill-spindle l , this sleeve fitting a threaded socket in the stock, being provided with a flanged head k' and a lock-nut k^2 , the latter being used to determine the precise position of the drill-spindle within the hub. A pair of nuts k^3 is provided on the spindle for the purpose of determining the extent of play or lengthwise motion of the spindle within the sleeve-bearing, a shoulder back of the cone-shaped head on the spindle coming into contact with the nearer end of the sleeve acting in connection with the ends to control the extent of play. Each drill-spindle is in proper position for work when it is brought into the vertical position, projecting downward from the head, as shown in Fig. 1 of the drawings, and there is sufficient lengthwise play always provided to allow of but a slight frictional contact between the driving-surfaces on the friction-wheel and the surfaces of the cone on the drill-spindle, in order that the drill may be used for light work and the degree of driving power brought upon the drill-spindle may be proportioned to the work required. If a greater degree of driving power is required, it is gained by simply raising the work and thus bringing a greater pressure lengthwise upon the drill, and the greater such pressure the closer will be the contact between the bevel-surfaces of the fric-

tion driving-wheels and the surface of the cone, making a very delicate automatic adjustment between the work required and the power employed.

My invention has been herein illustrated and described in connection with an upright drill; but it is evident that my invention is applicable to other forms of cutting-tools besides drills without requiring any material change in the parts.

In order to hold the turret-head in proper position while one of the tools is being used, a lock N is employed, and this comprises a spring-bolt M, arranged in a socket in the front part of the frame and with one end projecting into a bolt-socket n in the turret-head. A spring m' is arranged in the bolt-socket in such a manner as to press the bolt normally toward the bolt-socket, and the outer end of the bolt has a groove-head m^2 , with which a pin borne on the upper end of the bell-crank o is engaged. This bell-crank lever is mounted on the frame and has a connecting-rod o' extending from the end of the bell-crank to a lever or treadle, by means of which the bolt may be withdrawn, so as to enable the turret-head to be rotated until the desired tool has been brought into position for use, when the locking device automatically secures the head against further rotation.

The double lock-nuts used on the respective driving-shafts enable the latter to be adjusted lengthwise, so that the respective friction-wheels on said shafts may be exactly adjusted with reference to the head of the respective drill-spindles when the latter are in operative position.

I claim as my invention—

1. In combination with a supporting-stand, the main driving-shafts having a common axis and supporting on their outer ends frictional driving-wheels, the frictional driving-wheels with beveled edge fast to the respective shafts, the turret-head mounted eccentric to the driving-shafts, and the drill-spindles supported by the turret-head and each having a cone-shaped head located in operative relation to the driving-wheels, all substantially as described.

2. In combination with a supporting-stand, the main driving-shafts having a common axis and supporting on their outer ends the friction driving-wheels, the driving-wheels with beveled edges arranged in opposition, the rotary turret-head mounted eccentric to the driving-shafts, and the rotarily-arranged tool-spindles supported in stocks in the turret-head, the several spindles each having a tapered head arranged in operative relation between the opposing edges of the driving-wheels and also having a limited lengthwise movement in their supports, all substantially as described.

3. In combination with a supporting-stand, a main driving-shaft having a friction driving-wheel secured to it within the turret-head, a rotary turret-head mounted eccentric to

the driving-spindle, and the rotarily-arranged tool-spindle having a driving-wheel with its surface arranged in operative relation to the main driving-wheel, all substantially as described.

4. In combination with a supporting-standard, a frame mounted on said standard, a main driving-shaft mounted in bearings on the frame, having a bevel gear-wheel and a driving-pulley, a driving-shaft mounted in bearings on the frame, a cog-wheel fast to the shaft and in mesh with the bevel-cog on the main shaft, a friction driving-wheel secured to the other end of the tubular shaft, a driving-shaft arranged and supported within the tubular shaft and having a cog-wheel in mesh with the wheel on the driving-shaft and also a friction driving-wheel secured near the opposite end of the shaft, a rotary turret-head mounted on the frame and supporting a plural number of tool-spindles, the several tool-spindles rotarily arranged on the turret-head and each having a tapered head adapted to be moved into frictional contact with the friction driving-wheels, and the turret-locking device, all substantially as described.

5. In combination with a supporting-frame, a driving-shaft mounted on said frame and bearing a frictional driving-wheel, a rotary turret-head mounted eccentric to the axis of the said driving-shaft and supporting a plural number of drill-spindles, and the drill-spindles rotarily arranged in their respective stocks and having a limited lengthwise play therein and having on the inner end of each spindle a frictional driving-wheel in operative relation to the frictional driving-wheels, all substantially as described.

6. In combination with a supporting-standard, the spindle-driving shafts mounted in bearings in the frame and having a common

axis, the friction driving-wheel secured to the respective shafts and having beveled edges, a rotary turret-head mounted on the frame eccentric to the axis of said shafts, a bearing-block supported in a socket in the inner surface of the outer wall of the turret and having an eccentric-socket supporting the outer end of the inner driving-shaft, the counterpoise-weight connected to the stem projecting from the bearing-block through the outer wall of the turret-head, and the several drill-spindles radially arranged in the periphery of the turret-head and having each on its inner end a bevel-wheel adapted to fit between the opposing edges of the two frictional driving-wheels, all substantially as described.

7. In combination with a supporting-standard, the main driving-shafts having a common axis and supporting on their outer ends the friction driving-wheels, with means for rotating said wheels in opposite directions, the rotary turret-head, and the tool-spindles supported in the turret-head, each with a head located between the opposing surfaces of the driving-wheels, all substantially as described.

8. In combination with a supporting-standard, the main driving-shafts having a common axis and supporting on their outer ends the friction driving-wheels, with means, substantially as described, for turning said wheels in opposite directions, the rotary turret-head mounted eccentric to the driving-shafts, and the drill-spindles supported in the turret-head and each having a head arranged in operative relation to the driving-wheels, all substantially as described.

ALANSON D. QUINT.

Witnesses:

CHAS. L. BURDETT,
ARTHUR B. JENKINS.