J. McLELLAN.

MULTIPLE DRILL MACHINE.

APPLICATION FILED NOV. 23, 1911.

1,075,588. Patented Oct. 14, 1913.

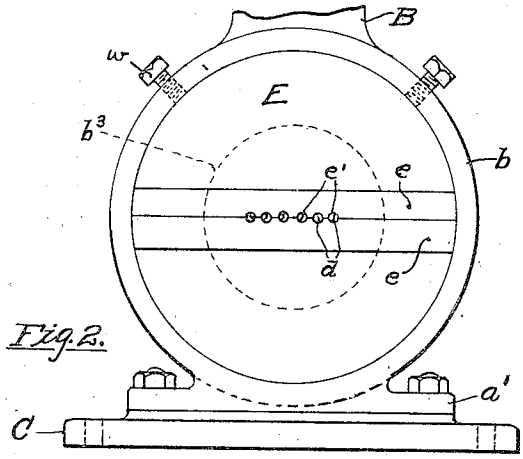


Fig. 2.

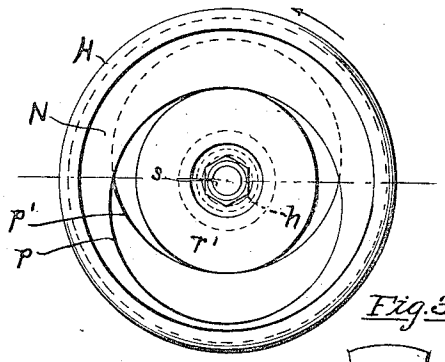


Fig. 3.

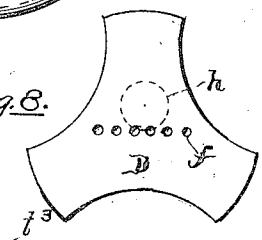


Fig. 8.

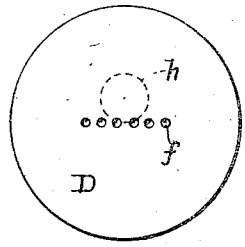


Fig. 7.

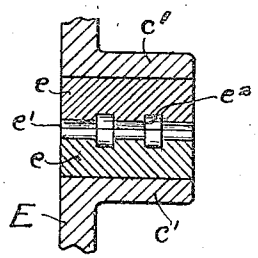


Fig. 6.

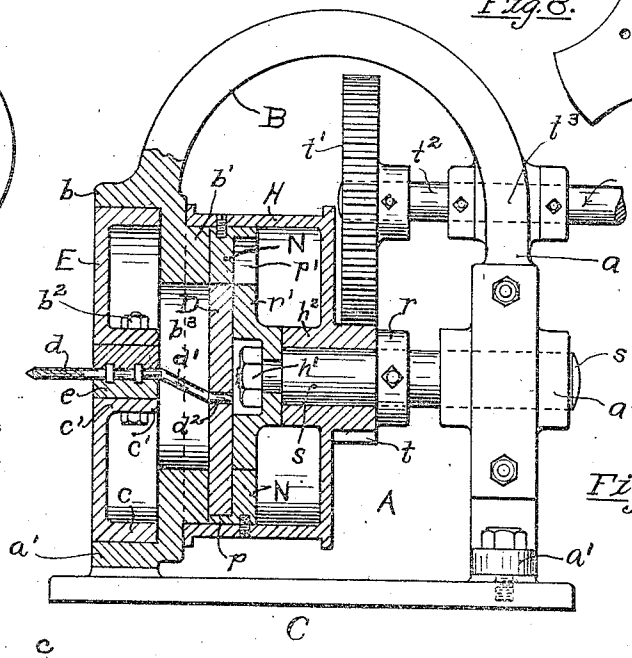


Fig. 1.

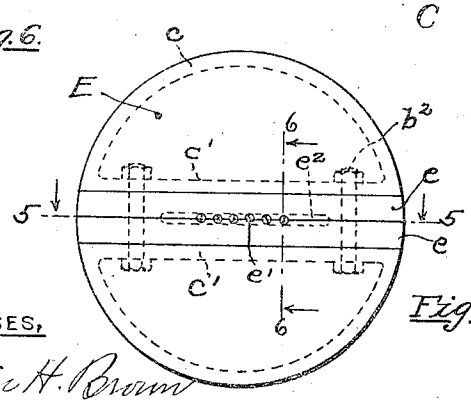


Fig. 4.

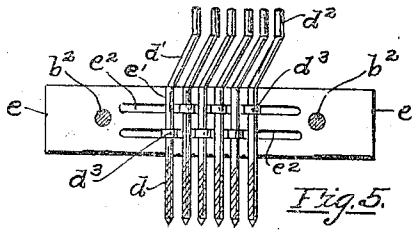


Fig. 5.

WITNESSES,

Calvin H. Brown

Nellie M Gustin

INVENTOR.

John McLellan.

BY Geo. H. Remington,

ATTY.

UNITED STATES PATENT OFFICE.

JOHN McLELLAN, OF PROVIDENCE, RHODE ISLAND.

MULTIPLE-DRILL MACHINE.

1,075,588. Specification of Letters Patent. Patented Oct. 14, 1913.

Application filed November 23, 1911. Serial No. 661,808.

To all whom it may concern:

Be it known that I, JOHN McLELLAN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Multiple-Drill Machines, of which the following is a specification.

This invention relates to machines of the class having a number of simultaneously revoluble drills adapted to be actuated for producing in the work at one operation a corresponding number of holes.

The object I have in view is to produce a relatively small, light, simple, and comparatively inexpensive and self-contained multiple drilling or boring machine, the same capable of being employed in the simultaneous drilling of a few or a comparatively great number of holes, as desired, without any change whatever in the general structure and normal adjustment of the machine.

In the accompanying sheet of drawings, Figure 1 represents in partial elevation and central longitudinal section, a side view of my improved multiple drilling machine, complete; Fig. 2 is an end elevation of the machine, viewed from the left; Fig. 3 is a corresponding end view of the driving pulley, detached; Fig. 4 is a similar end elevation of the stationary holder member, detached, in which the several drills are adapted to be revolubly mounted; Fig. 5 is a plan view of the holder, taken substantially on center line 5—5 of Fig. 4, showing a number of drills mounted therein; Fig. 6 is a partial vertical section, enlarged, taken on line 6—6 of Fig. 4; Fig. 7 is a detached front end view of the eccentrically movable inner disk-like holder, adapted to receive the inner or crank ends of the drills; and Fig. 8 represents a modified form of it.

The following is a detailed description of my improved multiple-drilling machine, and including the manner of its operation:

A, in the drawings, designates the machine as a whole; B the main frame or housing having vertical right and left side bits, *a* and *b*, each terminating at the bottom end in a foot a^1, in turn secured to a base or sole-plate C. The bit *b* is circular and bored to removably receive the relatively large holder E; screws *w*, Fig. 2, serving to maintain it in position therein against turning. The back or inner end portion of said bit *b* is turned off true to produce an outer shoulder b^1, adapted to receive thereon and form a bearing for the adjacent portion of the rim of the revoluble driving element or pulley H, as clearly shown in Fig. 1. This pulley, which may be belt-driven, has its center or hub portion h^2 revolubly mounted on a horizontal shaft *s*, the latter being held against rotation in a clamp or support a^2 of the side-bit *a*. The inner end portion of the shaft is reduced in diameter and extends through a recessed concentric disk r^1 and is rigidly held against movement by a nut h^1. At the same time, a collar *r*, adjustably secured to the shaft and bearing against the rear face of the pulley-hub, in coöperation with said disk r^1 and shoulder b^1 serves to accurately maintain the pulley in position both endwise and centrally; the disk r^1 also forms a backing for the eccentrically mounted crank member D, soon to be described.

The rim of pulley H is bored or turned to receive the inner eccentrically bored disk N, the latter being secured to and adapted to revolve in unison with the pulley. The front and rear faces of the disk are provided with oppositely disposed, reversely arranged eccentric recesses, *p*, p^1, respectively; each of which extends about midway of the disk's thickness, as clearly shown in Figs. 1 and 3. The rear recess, p^1, forms an additional guide and support for the stationary disk r^1 and the shaft *s*. The said disk or partition N may be made integral with the pulley, if desired. The eccentrically disposed front recess *p* is adapted to freely receive the coaxial disk-like member D, in which latter the corresponding ends of the drills are journaled. See Fig. 1.

The partition N for convenience in manufacture is removably secured to the pulley and in assembling is made with the eccentric recesses P; P^1 on reverse sides, though obviously, the device will operate in the same manner with the recess P^1 concentric of the partition. With the eccentric recesses in opposite faces of the partition however, it becomes immaterial in assembling, which face of the partition is used as the inner face, and in event of wear of the wall of the recess engaged by crank D, the partition may be removed and reversed so that crank D will be received in recess P^1 and the disk r^1 received in recess P. The disk r^1 also forms a backing for the disk D which it is preferable to provide.

The cylindrical holder E is shown as consisting of upper and lower segments, each having an inwardly extending peripheral rim c and base flange c^1. Between these flanges are mounted a plurality of drill-holders proper e, of brass, in the meeting faces of which are formed a number of uniformly spaced, semi-circular, registering holes e^1, extending longitudinally of the machine, adapted to receive the shanks of the respective drills d. I prefer to provide the drills with thrust-collars d^3, arranged in a staggered form, and having the adjacent faces of members e grooved at right angles to said holes e^1 to receive these collars, as shown at e^2, Figs. 5 and 6. Said collars serve to prevent the revoluble drills from moving endwise. After the drills have been mounted in the holder the whole is clamped together by means of bolts b^2. Obviously, this latter operation is preferably done before the holder is positioned in the bit b.

The inner holder or drill-actuating member D, preferably made of brass, is movably mounted in the eccentric recess p formed in the member N of the revoluble driving-pulley. The holder, D, which may be disk-shaped, is, as shown, provided along its center line with a series of holes f, to freely receive the inner or offset end portions d^2 of the respective drills; the degree of said offset being the same as the amount of eccentricity. Fig. 7 shows the relation of the disk's center to the normal center of the machine, wherein the small dotted circle h indicates the eccentricity or throw during each revolution of the machine. See also Fig. 8.

It will be seen, referring to Fig. 5, that a portion, d^1, of the shank of each drill intermediate its ends is offset or bent at an angle, thus forming a crank whose circular "throw" or movement is the same as the length of the concentric circle h, before referred to.

Assuming, now, that the parts or elements herein described are assembled to produce an organized multiple drilling machine, substantially as shown in the drawings, the manner of imparting continuous simultaneous rotary movements to each and all the drills may be stated as follows: The action of the revolving driving-pulley H imparts a like movement to the eccentrically recessed, vertically arranged inner member N, secured to the pulley, and causes the disk D, or crank-disk, as it may be called (in which are journaled a series of drills d), movably mounted in said recess, and in cooperation with the centrally mounted, stationary drill holder E, to move bodily in varying horizontal parallel planes, corresponding to or limited by the amount of said circular throw h, whereby each and all of the drills in the series are positively rotated one complete revolution during each revolution of the driving-pulley. It will be noted, however, that as thus devised, the drill-carrier D does not revolve, although it moves bodily upward and from side to side in its eccentric seat, as stated. In fact, any given point on the outer edge or on the face of the member D, when mounted and actuated as described, is adapted to describe at such point during a revolution of the pulley a circle having the same diameter as h.

Obviously, the number and arrangement of drills which may be journaled in the face of the disk D is limited only by its area, in connection with the spacing distances apart of the drill-bearings and the amount of eccentricity or throw of the crank-circle h; it being understood that the cranks d^1 of all the drills should normally lie parallel with one another, that is, when economy in spacing is considered, so that the cranks will pass one another without striking.

As thus devised and arranged, the work or articles operated upon, as for example, the backs of brushes, is moved to and from the drills.

If desired, the machine may be operated by power transmitted through a driving-shaft t^2, revolubly mounted in a bearing t^3, and having a spur-gear t^1 adjustably secured to the inner end of said shaft, adapted to mesh into teeth t formed on the outer part of the hub of the pulley H, as shown in Fig. 1.

I claim as my invention:—

1. In a multiple-spindle drilling machine of the general character described, the combination with a stationary front head or holder, and a suitably mounted power-driven member eccentrically movable with respect to the holder and provided with transverse holes, of a separable or two-part stationary drill-holder proper removably mounted centrally in said head having a plurality of intersecting transverse and longitudinal grooves formed in the joint or meeting faces thereof, and a plurality of laterally off-set drills having fixed thrust-collars, the latter being mounted in said longitudinal grooves and having other portions of the drill revolubly seated in said transverse grooves and in the holes of the said eccentrically movable member, for the purpose set forth.

2. In a multiple-spindle drilling machine, the combination with a stationary front head or holder, and drills mounted therein having the inner ends of their shanks off-set from the axes of the drills, of a stationary supporting spindle, a power driven drive member mounted to revolve thereon concentrically with respect to the holder, said member including a pulley having an

interior partition, the front face of which is provided with an eccentric recess, a crank disk mounted for movement in said eccentric recess and having openings to receive the inner ends of said drill shanks, and a disk on said supporting spindle received in the rear face of said partition.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN McLELLAN.

Witnesses:
GEO. H. REMINGTON,
CALVIN H. BROWN.