No. 819,587. PATENTED MAY 1, 1906.

D. P. PAGE & A. VANDERVELD.

MULTIPLE BORING MACHINE.

APPLICATION FILED NOV. 9, 1903.

2 SHEETS—SHEET 1.

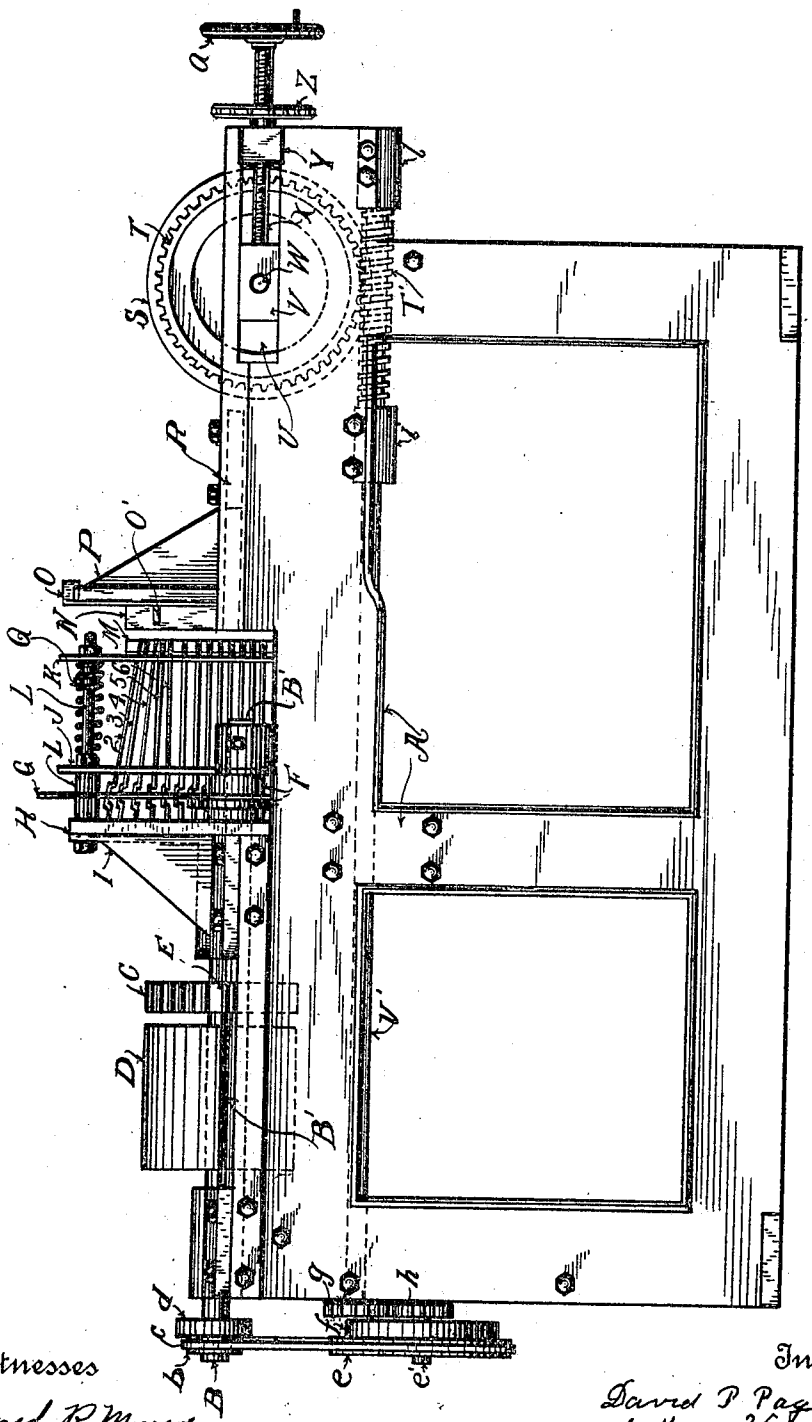


Fig. 1.

Witnesses

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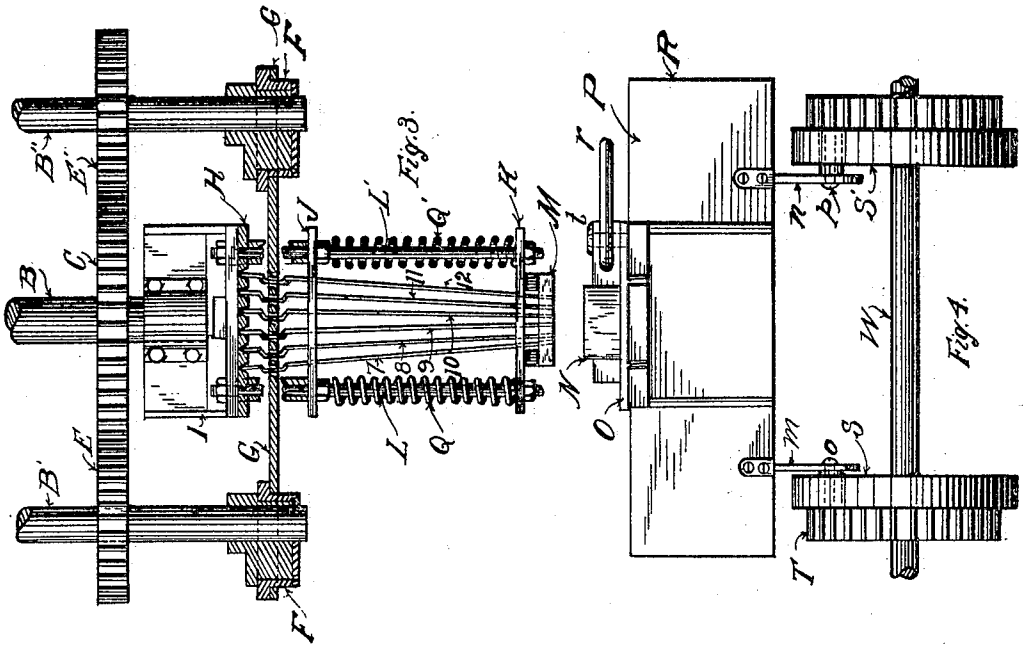


Fig. 4.

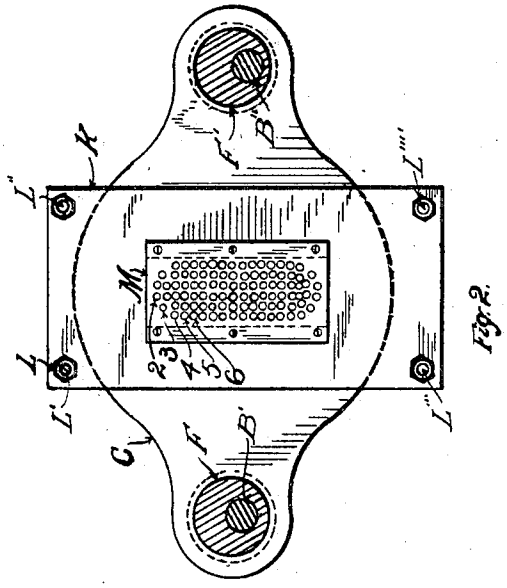


Fig. 2.

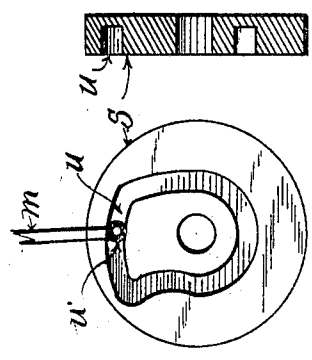


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

DAVID P. PAGE AND ANTHONY VANDERVELD, OF GRAND RAPIDS, MICHIGAN, ASSIGNORS TO GRAND RAPIDS BRUSH COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION.

MULTIPLE BORING-MACHINE.

No. 819,587. Specification of Letters Patent. Patented May 1, 1906.

Application filed November 9, 1903. Serial No. 180,470.

To all whom it may concern:

Be it known that we, DAVID P. PAGE and ANTHONY VANDERVELD, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented new and useful Improvements in Multiple Boring-Machines, of which the following is a specification.

This invention relates to a new and useful multiple boring-machine; and the invention consists in the arrangement and combination of parts hereinafter described and claimed.

The objects of the invention are to furnish a machine for automatically boring a plurality of holes at one operation in a block, and the same is peculiarly adapted for boring blocks for brushes and similar purposes.

Another object is to furnish a machine that will work with great rapidity and accuracy; also, other objects hereinafter described.

These objects we accomplish by means of the mechanism described herein, and particularly illustrated in the drawings hereto attached, in which—

Figure 1 shows a side elevation of the boring-machine constructed in accordance with our invention, the dotted lines showing the position of the shafts and also of the feeding mechanism which feeds the block to the boring-bits. Fig. 2 is a front view of the bit-frame, showing the plate through which the boring ends of the bits project and also showing the driving-plate or eccentric-plate which revolves the bits. Fig. 3 is a plan view of the bit-frame, the driving-plate, the driving-gears, and also the springs which press back the guard-block after the blocks have been bored. Fig. 4 is a plan view of the feed mechanism which moves the stock to the bits. Fig. 5 is a side elevation of one of the cams which give the reciprocating motion to the feed-table, and Fig. 6 is a sectional view of one of said cams.

Similar letters refer to similar parts throughout the several views.

A shows the main frame of the machine, which frame is more fully shown in Fig. 1.

B is a center driving-shaft, which through proper gearing revolves the eccentric-shafts B′ and B″.

C is the driving-gear on the center shaft B.

E and E′ are the gears on the eccentric-shafts B′ and B″.

D is a driving-pulley on the shaft B, which receives its power from any suitable source.

F and F are the eccentrics on the shafts B′ and B″, which give the proper movement to the eccentric-plate G for revolving all the bits.

G is the eccentric-plate, which engages with the crank portions of the bits, as shown in Figs. 1 and 3, and the swinging motion given by the eccentrics through the eccentric-plate G gives the revolving motion to all the bits simultaneously.

H is a plate at the butt-end of the bits and is provided with a plurality of depressions, one for each bit, each depression receiving the butt-end of one of the bits and forming a journal or bearing for the bit at that end. The plate H is supported by a supporting-frame I, as shown in Figs. 1 and 3.

J is a plate which retains the bits in their sockets or depressions, said plate J having openings through which the said bits pass loosely, so as to revolve therein.

K is what we term an "end" plate, which is moved back against the actions of the springs Q, there being four of such springs, when the stock is fed to the boring ends of the bits. The springs Q are supported by four bolts, (shown by L,) these bolts being rigidly supported and provided with shoulders against which the springs press, as shown in Fig. 3. The springs Q Q Q Q press against the plate K, the plate K being held in position by nuts. The plate K is provided with openings through which the bits pass and forms a support for the guide-block M. The guide-block M is also provided with perforations for the bits, such perforations being in proper direction to receive the bits. The points of the bits are nearer together than the butts, as shown, so that in boring a block the outer tiers of holes incline outwardly, as is necessary in boring a block for a brush or similar purposes. This guide-block M can be pressed back by the stock, so as to allow the bits to project through said guide-block at sufficient distance to bore the holes in the stock to the required depth. This guide-block M being pressed backward by the stock draws in the outer tiers of bits, so as to bore the round holes at the proper inclination in the stock.

N shows a block to be bored held in the clamp O, which clamp is operated by means

of a lever, as hereinafter described, for clamping and releasing the block.

P is a movable carriage which feeds the block to the bits.

R is the bearing-surface of the plate or carriage P and bears or rests upon the plain surface of the frame A.

S S′ are the feed-cams for moving the feed-carriage P, which feed-carriage P is moved by means of the worm-gears T and T′, attached to the cams S S′, said feed gears and cams being mounted upon the shaft W.

U U U are slots in which the blocks V move. The blocks V are movable and are provided with a journal for the shaft W, said blocks moving in said slots U by means hereinafter described.

X X are screw-shafts for adjusting the block V to the required position for the purpose of producing the required depth of the holes bored in the stock by the bits.

Y and Y are stationary nuts through which the adjusting screw-shaft X passes. Z Z are sprocket-wheels keyed to the screw-shafts X X, so as to allow the screws to be moved longitudinally through the sprocket-wheels. The sprocket-chain (not shown) connects the sprocket-wheels Z Z in the ordinary manner.

a is a hand-wheel to operate the screws X X.

b and *d* (see Fig. 1) are cone feed-pulleys on the driving-shaft B.

c is a feed-belt running from B to the feed-pulley *e*.

f is a cone-pulley on the stud *e*′.

g is a gear on the feed-shaft V′.

h is a gear on the feed-pulley.

i is a center bearing for the shaft V′.

l is a bearing-box for the shaft V′.

m and *n* are arms attached to the carriage P and support the cam-rolls *u*′, which move in the cam-grooves *u*.

o and *p* are studs on the arms *m* and *n*, which studs carry the rolls *u*′ *u*′, as illustrated in Figs. 4 and 5.

r is a cam-lever on the clamp O for holding and releasing the block to be operated upon.

t is the stud forming a bearing for the lever *r*. The grooves *u u* are in the cams S S′, there being one groove for each cam, the general construction being shown in Figs. 4, 5, and 6.

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 show the bits. There may be any number of bits used, depending upon the number of holes to be bored at the same time. In practice we use a sufficient number of bits to bore the entire number of holes required in the stock block to be bored. The holes bored in the back of a brush are not very deep, and by the arrangement above described the block N can be pressed against the guide-block M, the guide-block retreating, allowing the bits to project through a sufficient distance to bore the block N, the outer rows of holes being inclined downwardly to correspond with the direction or incline of the bit.

The operation of our invention is as follows: The block to be bored is placed in the clamp O. Power is applied to the pulley D, thereby setting in motion the gears E and E′, and thereby giving an oscillating motion to the eccentric-plate G. This revolves simultaneously all the bits. The block is fed automatically by means of the belt *c*, passing around the pulley *e*, thereby operating the feeding mechanism by setting in motion the cams S S′, which give the reciprocating motion to the feed-table and through it to the block secured in the clamp O. As the feed-table moves forward the block N is pressed against the guide-block M, causing the same to retreat, allowing the bits to enter the block, boring the holes to the required depth. The continued revolution of the cams S S′ withdraw the table and clamp, allowing the operator to insert a new block in the clamp O. By this means the operation is continuous and the blocks can be bored with great rapidity and accuracy.

Having thus described our invention, what we claim to have invented, and desire to secure by Letters Patent, is—

In a boring-machine, the combination of a frame having a support, a stationary plate having a plurality of depressions, bars on said plates, separate movable plates having openings carried by said bars, springs between the plates, a guide-block mounted on the foremost plate, bits having their butt portion in said depressions and supported by the plates, means intermediate the plates for imparting rotary motion simultaneously to the bits, said block forming a guide for the cutting extremities of the bits, means for actuating said first-mentioned means, a movable work-support on said frame and means coöperative with the last-mentioned means to gradually move the work-support.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

DAVID P. PAGE.
ANTHONY VANDERVELD.

Witnesses:
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MARY S. TOOKER.