

(No Model.)

3 Sheets—Sheet 1.

W. J. GOULD & R. S. ALLEN.
COMBINED BIT AND ROUTING TOOL.

No. 540,657:

Patented June 11, 1895.

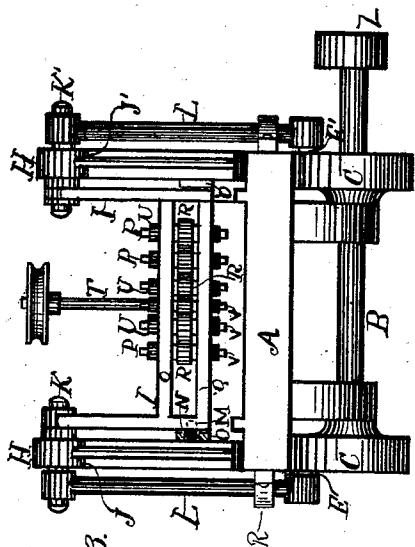


Fig. 3.

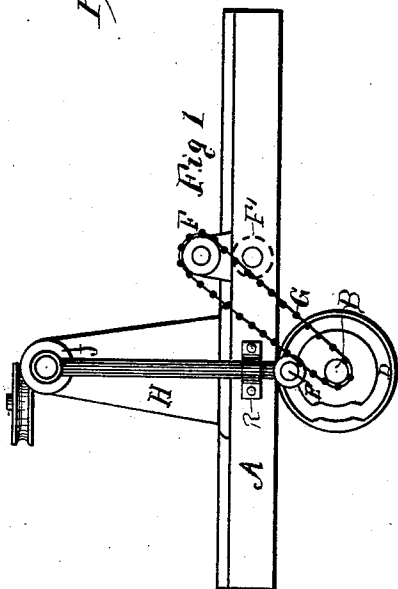


Fig 1

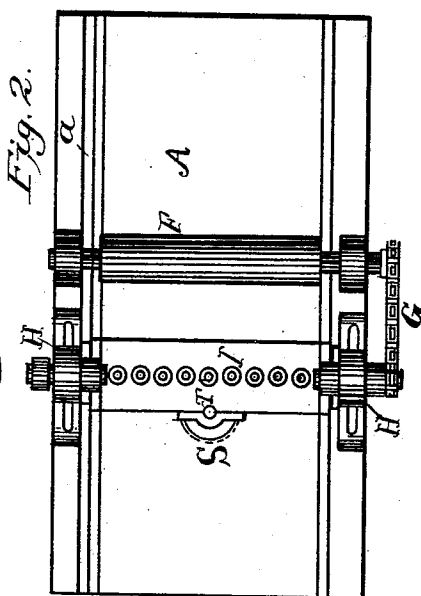


Fig. 2.

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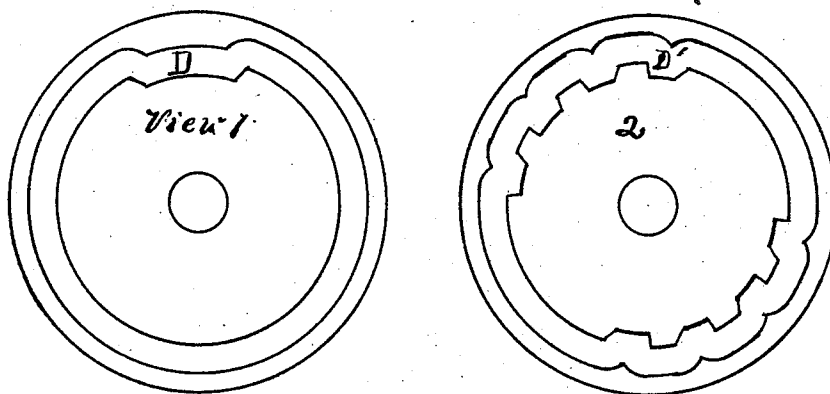
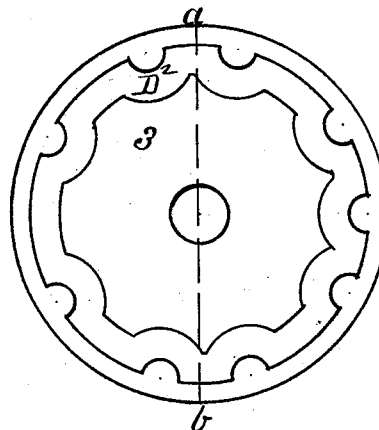
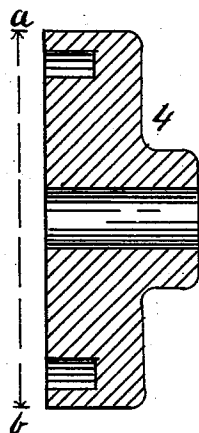


Fig. 4.



Witnesses.

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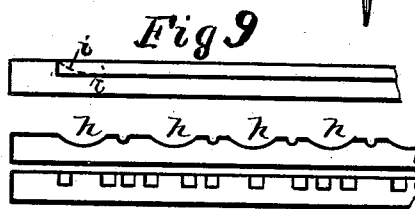
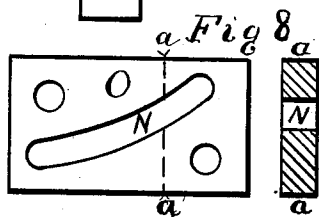
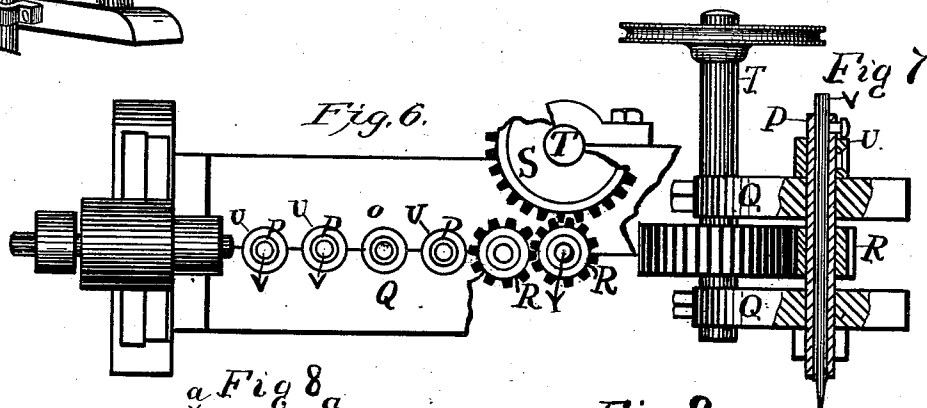
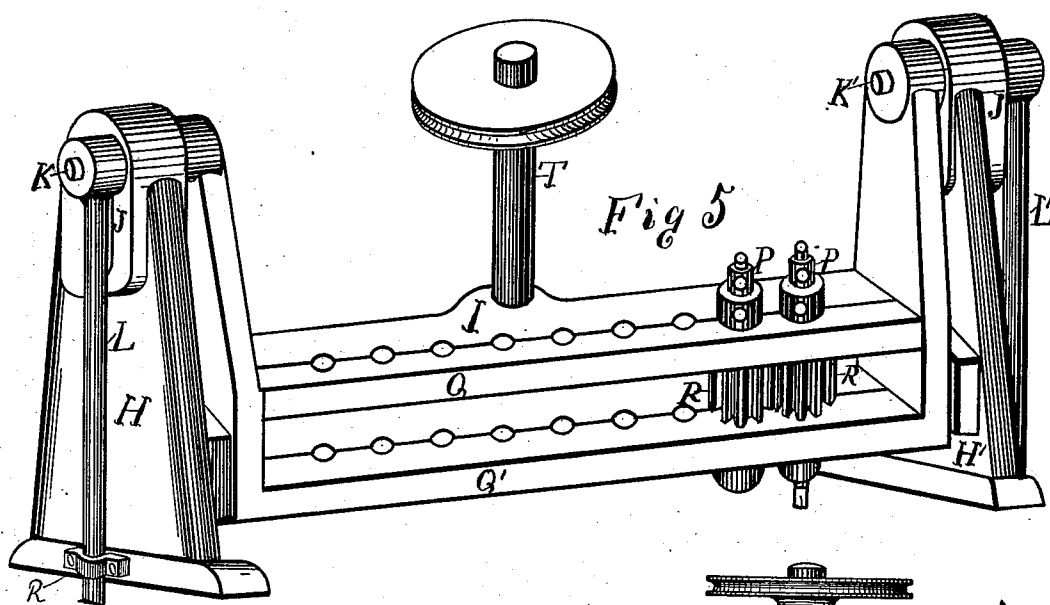
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Inventors
William J. Gould
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UNITED STATES PATENT OFFICE.

WILLIAM J. GOULD AND RODNEY S. ALLEN, OF BRIDGEPORT, CONNECTICUT.

COMBINED BIT AND ROUTING-TOOL.

SPECIFICATION forming part of Letters Patent No. 540,657, dated June 11, 1895.

Application filed March 24, 1894. Serial No. 505,022. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM J. GOULD and RODNEY S. ALLEN, of Bridgeport, county of Fairfield, and State of Connecticut, have
5 invented certain new and useful Improvements in Boring and Routing Machines for Working either Wood or Metal, of which the following is a specification.

Our invention relates, first, to the use of one
10 or more combined bit and routing tool, secured in a revolving spindle that may have a vertical or an angular position to a horizontal plane, the said spindle or spindles having a bearing in a vibrating frame, that has a two-
15 fold motion, one a vertical and another a vibrating motion at the point of contact with the cutting end of the bit; second, the material to be worked is moved by a device that gives it a horizontal motion, timed to the vertical
20 or angular motion of the bit; third, in the use of regular or irregular grooved cams that control the vertical motion of the bit frame, this cam working in harmony with the horizontal motion of the material worked; fourth,
25 in using a plate at the lower end of vibrating frame, that has a curve formed channel in which is guided a fixed pin to give the frame a vibrating motion timed with that of the vertical and horizontal.

30 The object of our invention is, first, to bore a plain hole into the moving material that shall be square to its face or to any desired angle, also to cut down the ends of grooves formed in the material giving a square down
35 cut and then to rout out the material left in the groove, by a circular cutter, when it first starts the groove, leaving the bottom of the groove level. Again by the irregular grooved cam, we can vary the groove changing its
40 depth or form.

Figure 1 is a side view of the complete machine. Fig. 2 is a plan of the machine. Fig. 3 is an end view of the machine. Fig. 4 is a view of the cams. View 1 shows the form of
45 groove provided in the cam when we wish to clean out the material left by a revolving cutter to leave the end or starting place of the groove square down to the face of the work. View 2 shows the form of the groove in the
50 cam to bore into the moving work three holes near each other, with a space between them and the three succeeding holes, repeating the

same over the whole work. View 3 shows the form of groove in the cam to bore holes of varying distance and is used for ornament- 55 ing purposes. View 4 shows a section of view 3 at *a b*. Fig. 5 is a perspective view of the frame and uprights on which the frame slides. Fig. 6 is a partial plan of the vibrating frame and uprights. Fig. 7 is a sectional 60 view of the vibrating frame and spindles. Fig. 8 shows face and sectional views of the device for imparting the vibrating motion to the frame. At Fig. 9 we show three forms of work as it comes from the bits P P. The 65 first shows the work of the bit in cutting out the curved portion left after the revolving cutter, producing a square down ending of the groove. This form is used for supporting sheets of copper in chemical solutions. The 70 second figure shows the work of the machine in ornamenting moldings. The third shows the work of the machine in boring a series of holes into strips.

A is the bed of the machine. 75

B is a shaft supported by hangers attached to the bed A.

C, and C, are two cams secured to the shaft B; D and D, grooves in the face of cams C, and C; E, E', rolls working in the grooves in 80 the cams C.

F and F' are two rolls for moving the material to be worked and driven by the chain belt G.

H, and H', are two uprights secured to the 85 bed A.

I, is a vibrating frame hinged in the uprights H, and H'.

J, and J', are guides in the uprights H, and H', for the pins K, and K', which are rigid in 90 the frame I, and extend outward by the uprights H, and H'.

R, R, are guides secured to the bed A to keep the connecting rods L, L', always in a vertical position. 95

L, and L', are rods connecting with the pins K, and friction roll E.

M, and M', are two pins fixed in the frame I, and project into grooves N, and N', in plates O, and O', attached to the uprights H. 100

P, shows hollow spindles with bearings in the bars Q, and Q'.

R, R, R, are toothed wheels secured to the spindles P, P, P.

S, is the driving wheel for imparting motion to the spindle P, and is secured to the shaft T, that has bearings on the frame I. The shaft T, gets its motion from a belt working on a pulley at its upper end or is driven by a system of gears. Not shown.

U, U, U, are collars fitted to the spindles P, P, and are fitted with set screws to allow for adjustment as they wear endwise.

V, V, V, are the bits held in position longitudinally by the set screws.

Z represents a pulley for driving shaft B connected by belt with main shaft. Not shown.

The operation of the machine is as follows: On the bed A, and between the rolls F, and F', we put the material to be worked. If it is a piece that has been grooved out part of its length and we wish to have the end of the groove squared down the rolls F and F' are set so that they will carry the material in time to the bits V, the raised side *a*, of the bed A, acting as a guide sidewise. The grooves D, D', and D² in the cams C, C', and C² are arranged to cause a downward motion to roll E working in them. This attached to the rods L, L' connects the pins K, K' to the roll E. The pins K, K' being rigid in the frame I takes this down carrying the revolving spindles P with it boring the end of the groove out. To cut the end of the groove in the material square with the face of the moving material, the cutting point of the bit, V, must have combined with its vertical motion a horizontal motion. To produce this we attach to the standards, H, H', the plates O, O', in which are worked the grooves N, in which the pins M, M', (rigid in the lower end of the sides of the swinging frame I,) slide. These grooves are curved to give to the cutting point of the bit V, the same speed forward as the moving material, while the bit is descending and doing its work of cutting down the end of the groove in the material. As soon as the pins, M, M' reach the end of the groove, N, they stop all movement of the frame I, while the material continues its forward motion, when the side of the bit V or routing portion routs out the curved material left in the groove from the revolving cutter. At this point the grooves, D, in cam, C, change direction throwing up the rolls E carrying with it the frame I and bits V.

If we wish to bore a series of holes in moving material with a space equal or varied between them, the grooves D are formed to suit the spaces and depth as shown by the lines in the face of the cam C' the vibrating motion of the frame I, adjusts the movement of the

bit V, so that the holes will be square down from the face of the material. If we wish to have a series of curved depressions like lines at *h*, the grooves D², and the cam C², are arranged accordingly. The cams C are interchangeable for the purpose of varying the operation of the machine.

We can arrange the spindles P, at varying distances apart or at equal distances and have as many in a gang as desired. We can also have them of different depths by the setting of the bits V so that some will begin cutting sooner than others.

Having described our invention, we claim as new and desire to secure by Letters Patent—

1. The frame I, having the pins K, K', working in the guides J and J', allowing of a vertical motion to frame I; the plates O, O', having the segmental grooves N, and N', which guides the pins M, and M', rigid in the frame I, to produce a curved vertical and horizontal motion to the said frame I, as, and for the purpose specified.

2. In combination with said frame I having the said curved vertical and horizontal motions of the spindle P, revolving in bearings in bars Q, Q', said spindles having the adjusting collars U, the driving wheels R, the bit V, as described and for the purpose specified.

3. In combination with the said frame I of the uprights H, H', having the guide openings J, J', and the plates O and O'; said uprights secured to the bed A; the rods L, and L', connecting the pins K, and K', with the roll E, working in the grooved cams C and C', on shaft B, the feed rolls F, and F', working in time with the frame I, as, and for the purpose specified.

4. For the boring of a series of holes both latitudinally and longitudinally in material of either wood or metal, or the squaring down and routing out of the circular material left after the work of a revolving grooving cutter, said material being in motion; the combination of the grooved cams C, C', the rolls E, and E', connected to the moving frame I, having the revolving bit V; by the rods L, and L', the carrying rolls F, and F', the plates O, and O', having the segmental grooves N, and N', fixed to the uprights H, and H', the pins M, and M', rigid in frame I, all arranged to operate in time, as and for the purpose specified.

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Witnesses:

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