3 Sheets—Sheet 1.

G. R. MATHER.

TURNING REGULAR FORMS.

No. 108,805. Patented Nov. 1, 1870.

Fig: 1.

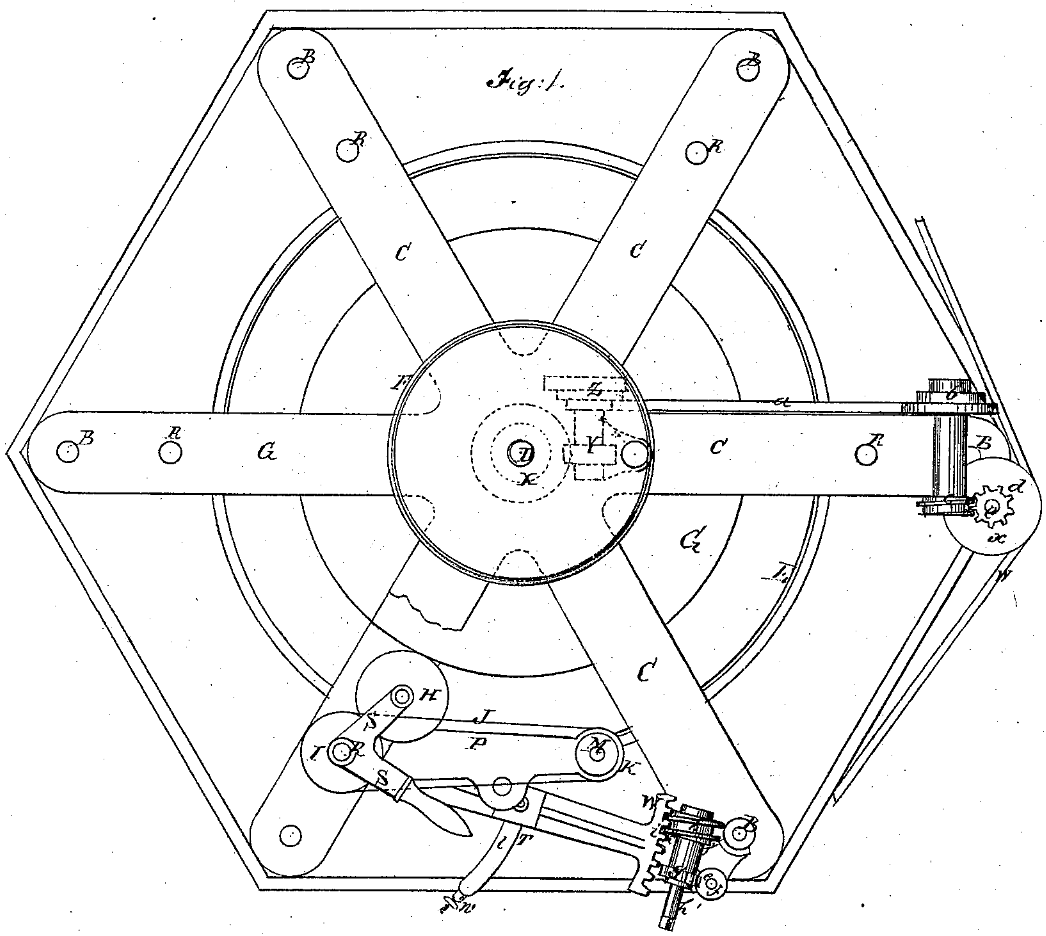
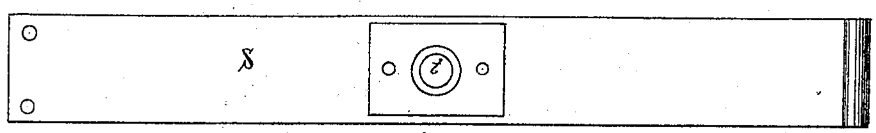


Fig: 3.



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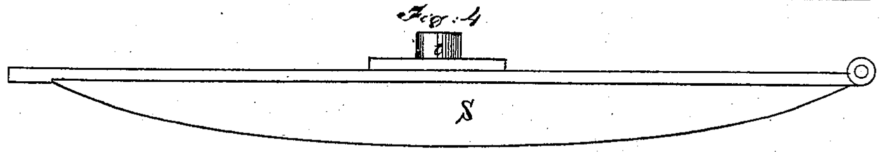

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TURNING REGULAR FORMS.

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Fig. 2.

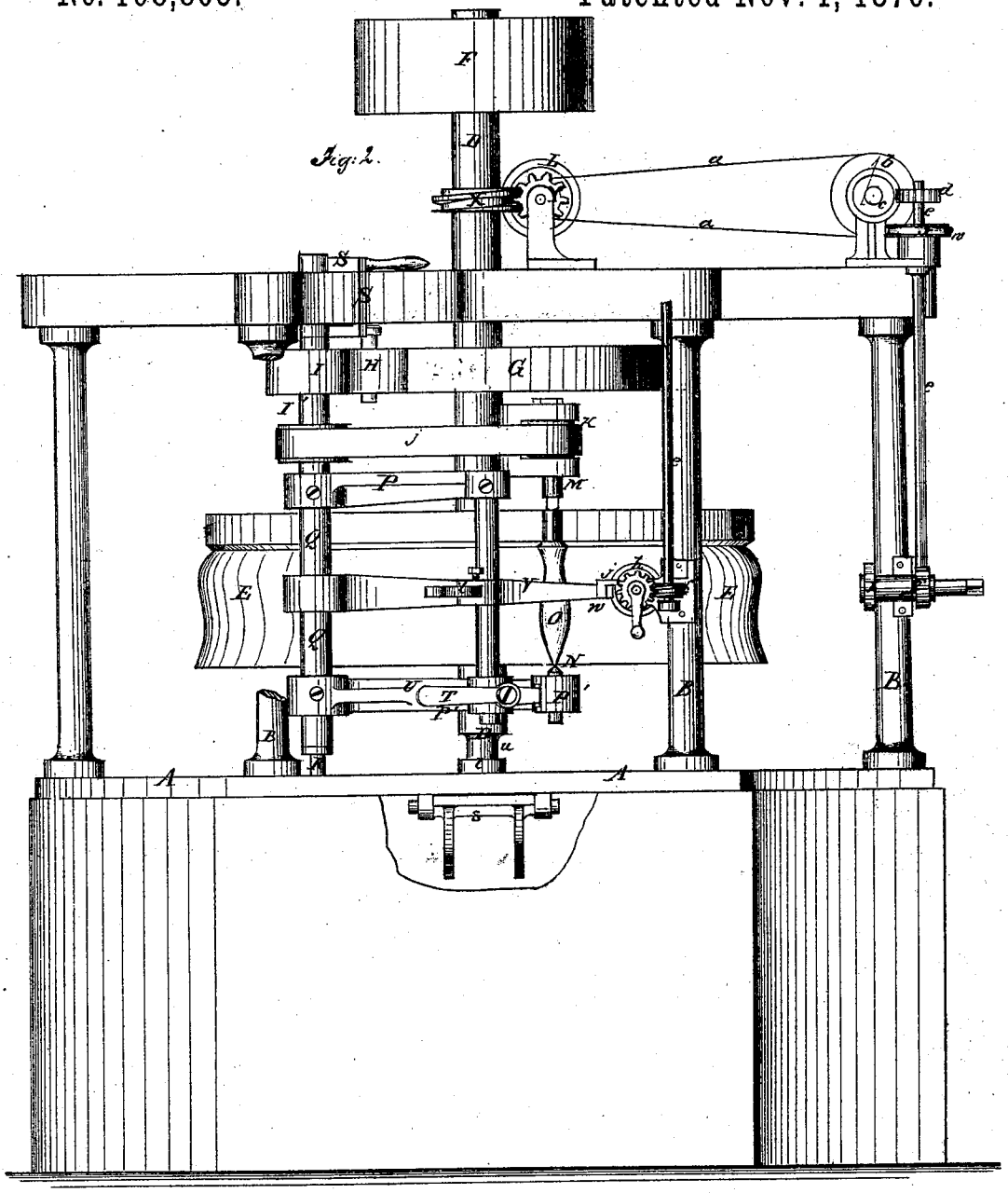

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Fig: 5.

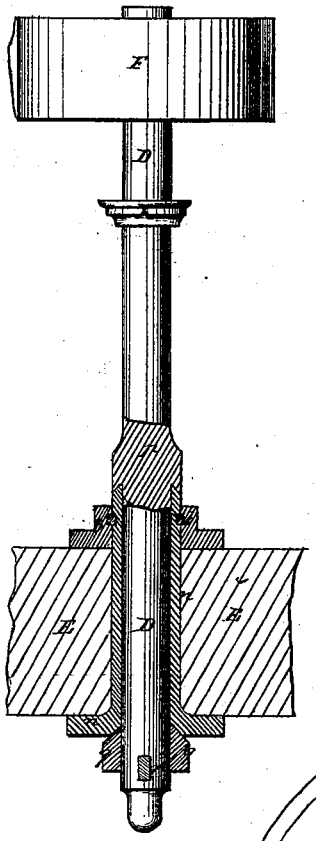


Fig: 7.

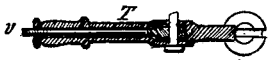


Fig: 8.

Fig: 9.

Fig: 6.

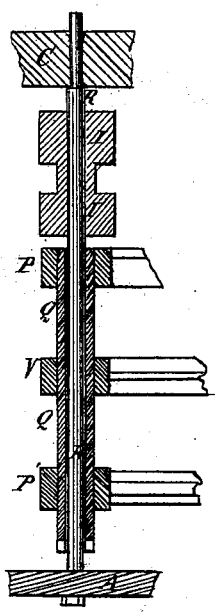
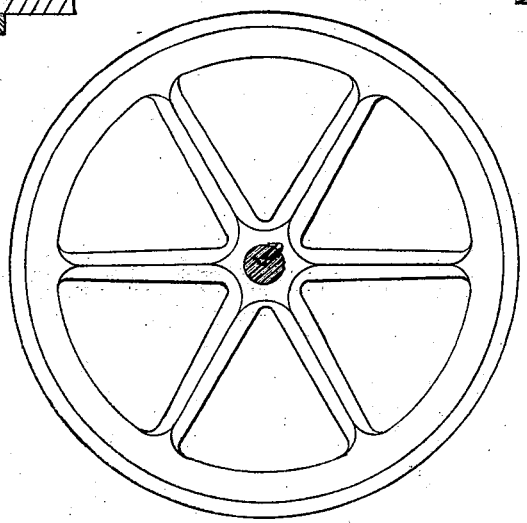


Fig: 10.



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United States Patent Office.

GEORGE RADFORD MATHER, OF WELLINGBOROUGH, ENGLAND.

Letters Patent No. 108,805, dated November 1, 1870.

IMPROVEMENT IN APPARATUS FOR GIVING FORM TO WOOD.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, GEORGE RADFORD MATHER, of Wellingborough, in the county of Northampton, in England, have invented a new and useful Improvement in Means or Apparatus for Cutting or Giving Form to Wood; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

The invention relates to the use of stone, artificial stone, or other gritty composition adapted to cut into wood and give form thereto.

For this purpose the natural or artificial stone or composition is fitted to a spindle, which is caused to revolve, and the form desired to be given to the wood is produced, as a counterpart, on the edge or other surface of the stone or composition.

If the articles to be cut in wood are circular, they are supported on spindles or centers, carried by levers or other arms or guides in series, and by bands or otherwise caused to revolve, and they are replaced in succession, as the forms desired are obtained.

The wood to be cut, if of continuous length, as in the case of moldings, is conducted by guides to the surface of the revolving stone or composition.

The invention is particularly applicable to the giving the requisite form to wood for tool and other handles, and such like articles.

To clear the wood and other dust from the stone, and prevent its impeding the action of the machinery, a blast of air, jet of water, or a brush may be used. I prefer to use the jet of water, as it acts as a lubricant.

Figure 1, plan of an arrangement constructed in accordance with my invention for cutting or forming circular articles. The cutting-stone or composition shown fitted for this apparatus is for cutting or forming tool-handles, but other stones may be substituted when necessary for forming or molding other articles, such as chair and table-legs.

Figure 2 is a side view of the same.

Figure 3 is a plan of hinged bray or beam upon which main vertical spindle is supported.

Figure 4 is a side view of the same.

Figure 5 is a view of the main vertical shaft, showing method of fixing stone.

Figure 6 is a view of fixed or movable spindle carrying radiating arms.

Figures 7, 8, and 9 are views of fixing-rod U and lever T.

When expensive compositions are used for cutting or forming, instead of forming a solid wheel of composition, I fix the composition around the periphery of a wheel similar to that shown in Figure 10.

Before subjecting the wood to be cut or formed to my apparatus, I prefer to roughly shape the same.

To figures 1, 2, 3, 4, 5, 6, 7, 8, and 9 the following letters of reference refer when the parts indicated by said letters of reference are shown in said figures.

A, bed-plate, carrying columns B, supporting top-frame C.

D, vertical shaft, on which cutting or forming-stone E is mounted.

F, main driving-pulley, fixed to vertical shaft D.

G, friction-wheel, mounted on shaft D, transmitting motion to the wood to be cut or formed through the wheels H, I, and I', the strap J, and pulley K fixed to spindle, which carries the driving-center M, between which and the center N the wood O to be cut or formed is mounted.

The centers M and N are carried by radiating arms P and P', which are fixed by set-screws to a tubular spindle, Q, concentric with the fixed spindle R.

The radiating arms P and P' may be fixed to the spindle R, which may work in suitable centers at each end.

When it is desired to stop the motion of the wood to be cut or formed, the forked lever S, radiating on the spindle R, is moved so as to throw the wheel H out of gearing with G. The center N is adjusted by the lever T, and fixed by the spring-rod U with screw and nut.

The wood to be cut or formed is brought up to the stone, as it is cut away, by motion communicated to the radiating arms P and P'.

To the tubular shaft Q, to which the arms P and P' are fitted, is also fitted another radiating arm, V, provided with a toothed segment, W, acted upon by the following arrangement:

To the shaft is attached a worm, X, gearing with a worm-wheel, Y, to which is connected a cone or change-pulley, Z. A strap or band, *a*, communicates motion from Z to another cone or change-pulley, *b*, on the spindle of which is also fixed a worm, *c*, which gears with a worm-wheel, *d*, mounted on a vertical shaft, *e*, to the lower end of which vertical shaft *e* a worm, *f*, is fixed, gearing in a worm-wheel, *g*, on the same shaft, with which is fixed a worm, *h*, which gears in the toothed segment W, and so transmits the desired movement to the work as it wears away.

In order to regulate the distance the work O is to be carried forward, I provide the segment with a stop, *i*, (acted on by a spring, *j*, to prevent trembling,) which, when carried forward, is brought against a stop, K, fitted to the bracket carrying the worm *h* and worm-wheel *g*, or to any suitable part of the machine.

The amount of forward action of the arms I regulate by a quadrant or segment, *l*, (with set-screws or otherwise,) which passes through a slot in the arm V.

The centers are withdrawn from the stone for the removal of the finished work, and supplying new stock by the hand-crank *h'*, which is applied to the shaft of the wheel *g* for the purpose, and the said wheel is attached loosely and held by friction, to admit of turning the shaft backward.

The stone E I mount on the vertical shaft D as follows:

In each stone I fit a bush, *n*, and washer and keys, *b'*. The stone may be removed from the machine to its place without disturbing its center. The top end of the bush is made conical, to fit into a conical groove in a collar, *p*, on the shaft D. To the lower side of the stone I apply a conical washer, *q*, which fits into the bush *n*, and is secured by a key, *r*, which, when driven home, holds the bush *n*, and with it the stone, between the collar *p* and washer *q*.

The bray or beam S is hinged to one side of the machine, and is bolted at the opposite side. In its center it carries a cup, *t*, into which the step-end *u* of the vertical shaft D is placed and works. When it is desired to move the stone, the bray or beam is unbolted and let down into a groove or cutting in the base on which the machine is mounted, and the stone, being properly supported, the key *r* is withdrawn and the conical washer *q* removed, and the stone let down into the pit *v* provided for the purpose. A fresh stone or the same stone may be replaced by fitting it to the shaft D and bolting up the bray or beam.

I prefer to use in the machine above described more than one arrangement as described, for carrying and giving motion to the wood to be cut or formed.

In the machine as shown I arrange six such arrangements around the stone, although I can use more or less, and I connect all the vertical straps *e* with straps *w* and pulley *x*, so that, by driving one, as shown in the drawing, it can communicate an even motion to the rest.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The improved wood-forming machine herein described, all its parts being combined, constructed, and arranged to operate substantially as shown and set forth.

2. The detachable attachment of the stone to the mandrel by means of the conical bush *n*, conical collar *q*, key *r*, and collar and pin *b*, substantially as specified.

3. The combination, with the stone or other forming material E, of the oscillating center-supporting arms, feeding segmental arm, driving-wheels H I I' *j*, all substantially as specified.

4. The combination, with the segmental arm W and shaft D, of the worms *h g f*, shaft *e*, worms *d c*, cone-pulley *b*, and worms X Y, all substantially as specified.

The above specification of my invention signed by me this 16th day of July, 1869.

GEORGE RADFORD MATHER. [L. S.]

Witnesses:

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R. MAUDENTATHAN.