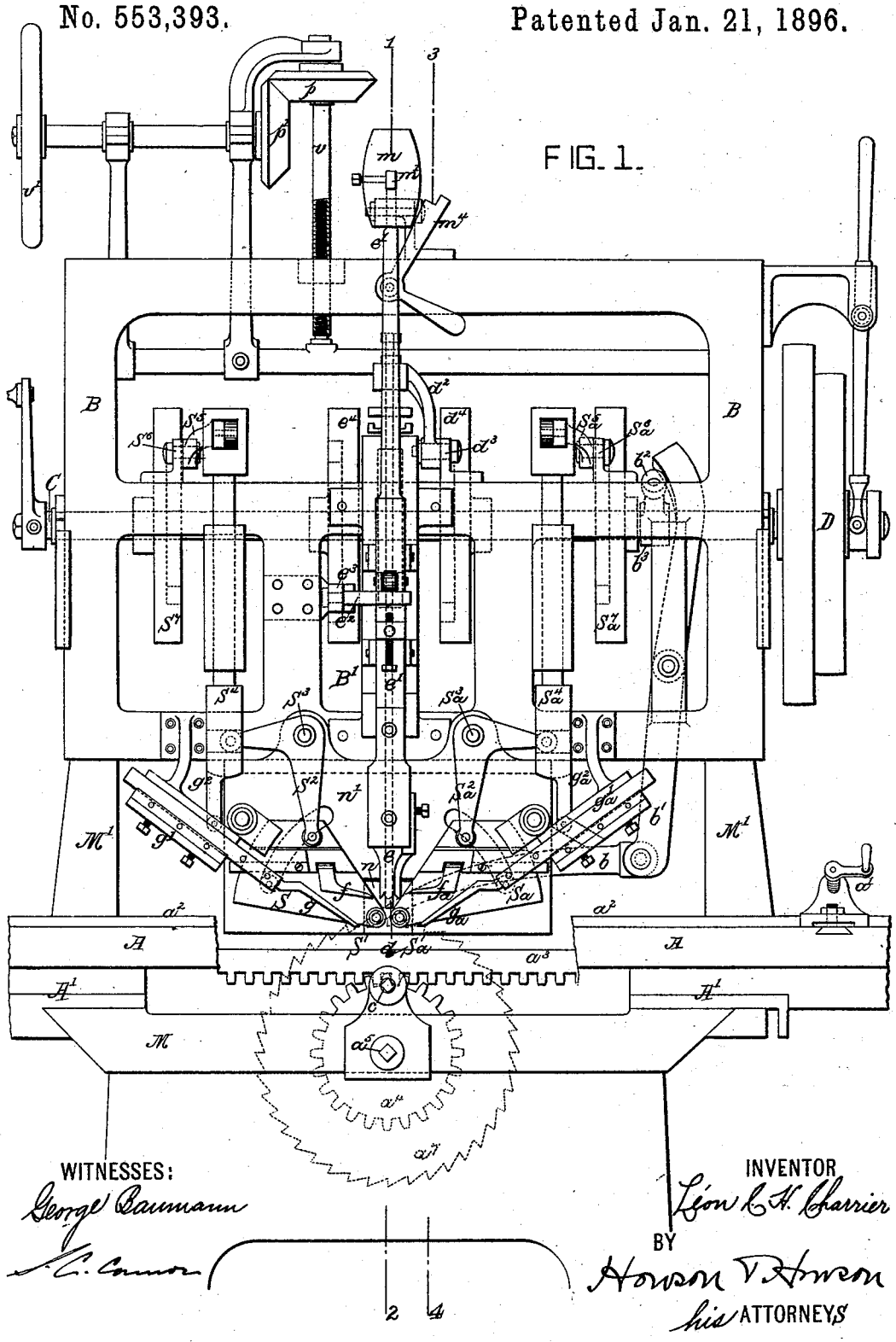
(No Model.) 9 Sheets—Sheet 1.

L. C. H. CHARRIER.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

No. 553,393. Patented Jan. 21, 1896.

FIG. 1.



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(No Model.) 9 Sheets—Sheet 2.

L. C. H. CHARRIER.

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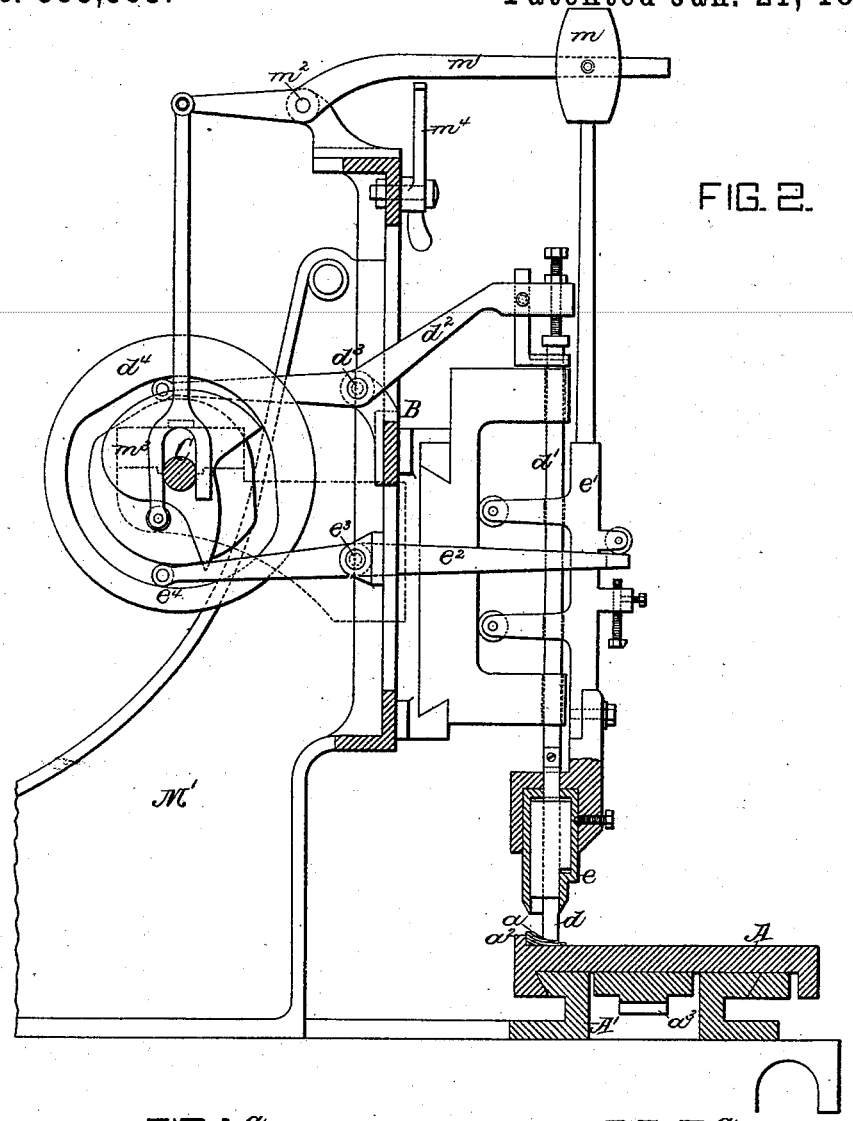


FIG. 2.

FIG. 1.ª

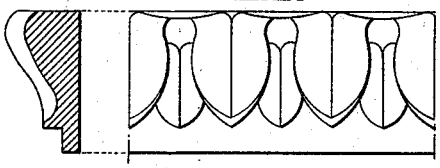
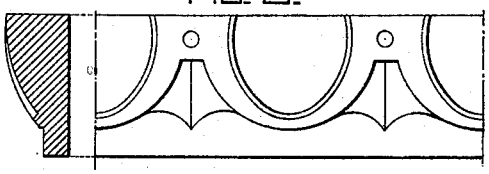


FIG. 2.ª



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L. C. H. CHARRIER.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

No. 553,393. Patented Jan. 21, 1896.

FIG. 3.

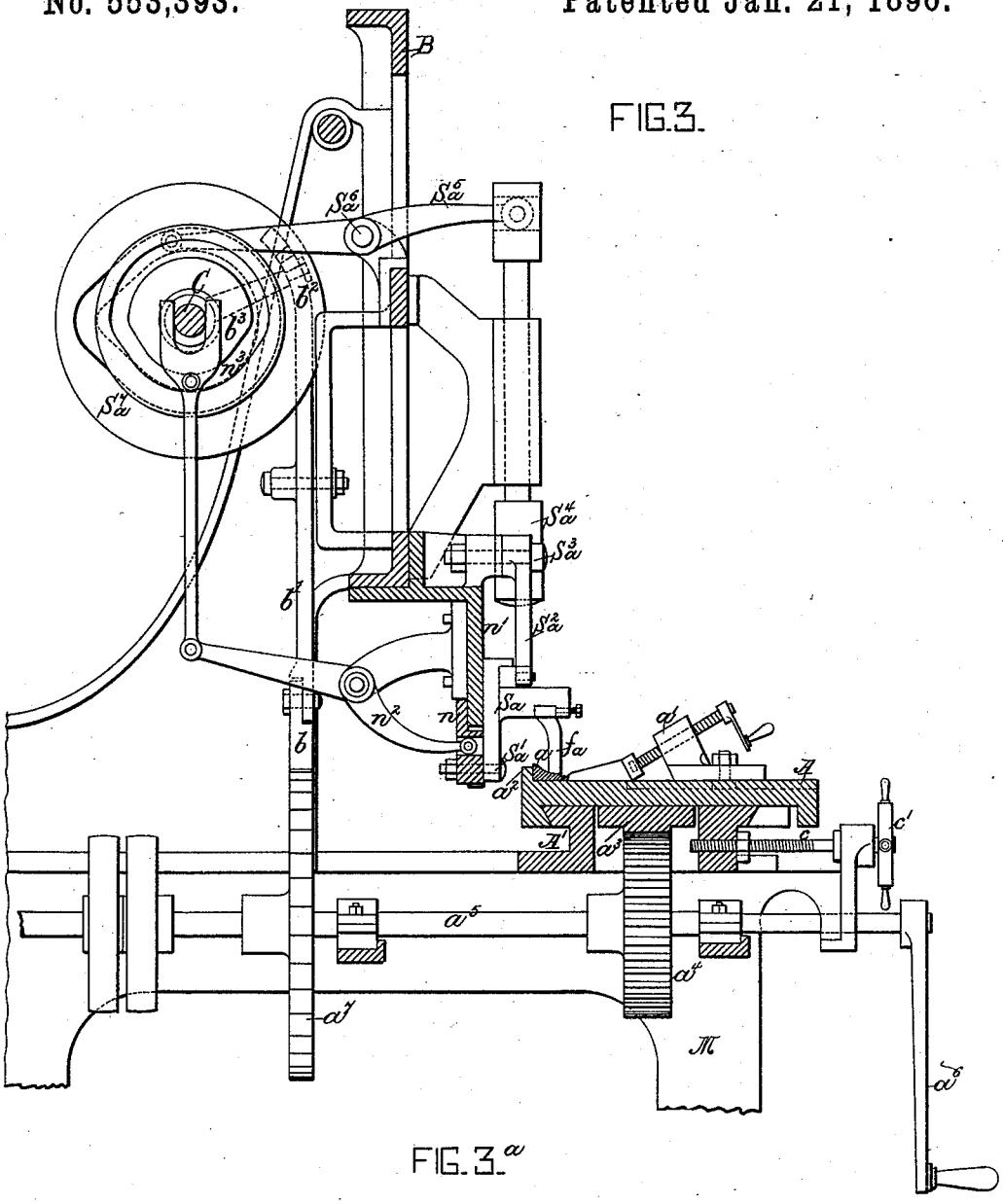
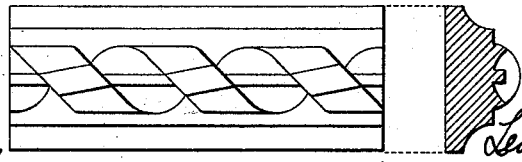


FIG. 3.a



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L. C. H. CHARRIER.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

No. 553,393. Patented Jan. 21, 1896.

FIG. 4.

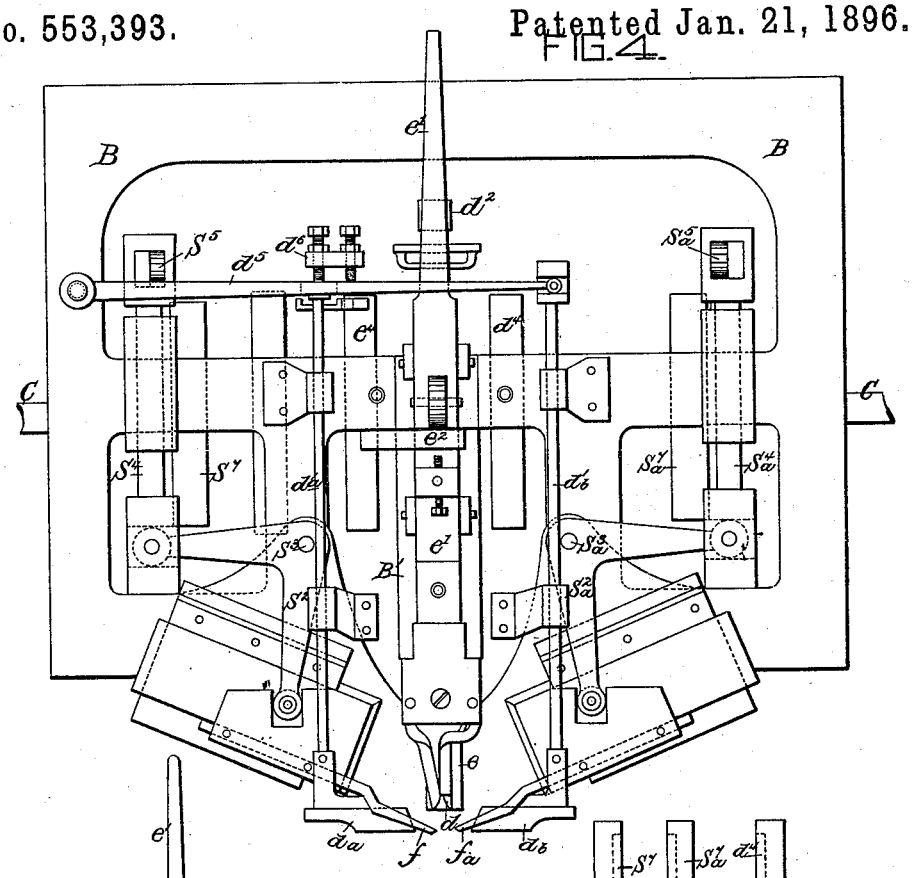


FIG. 4b

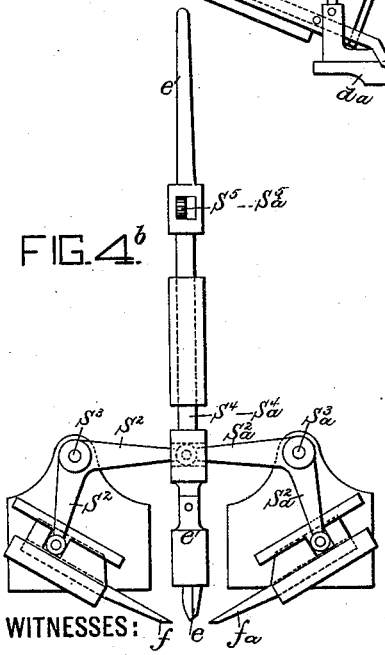
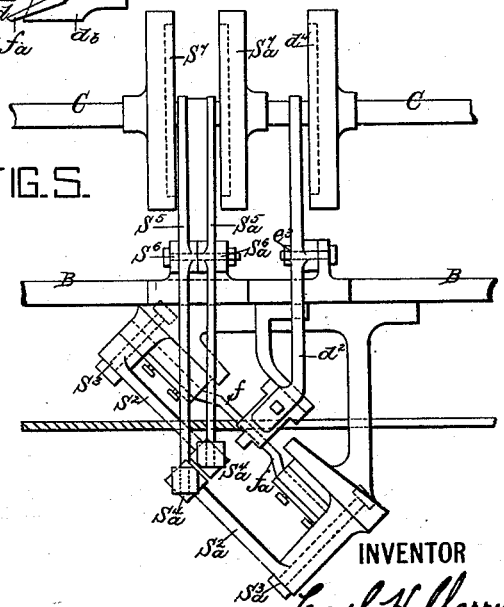


FIG. 5.



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L. C. H. CHARRIER.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

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FIG. 6.

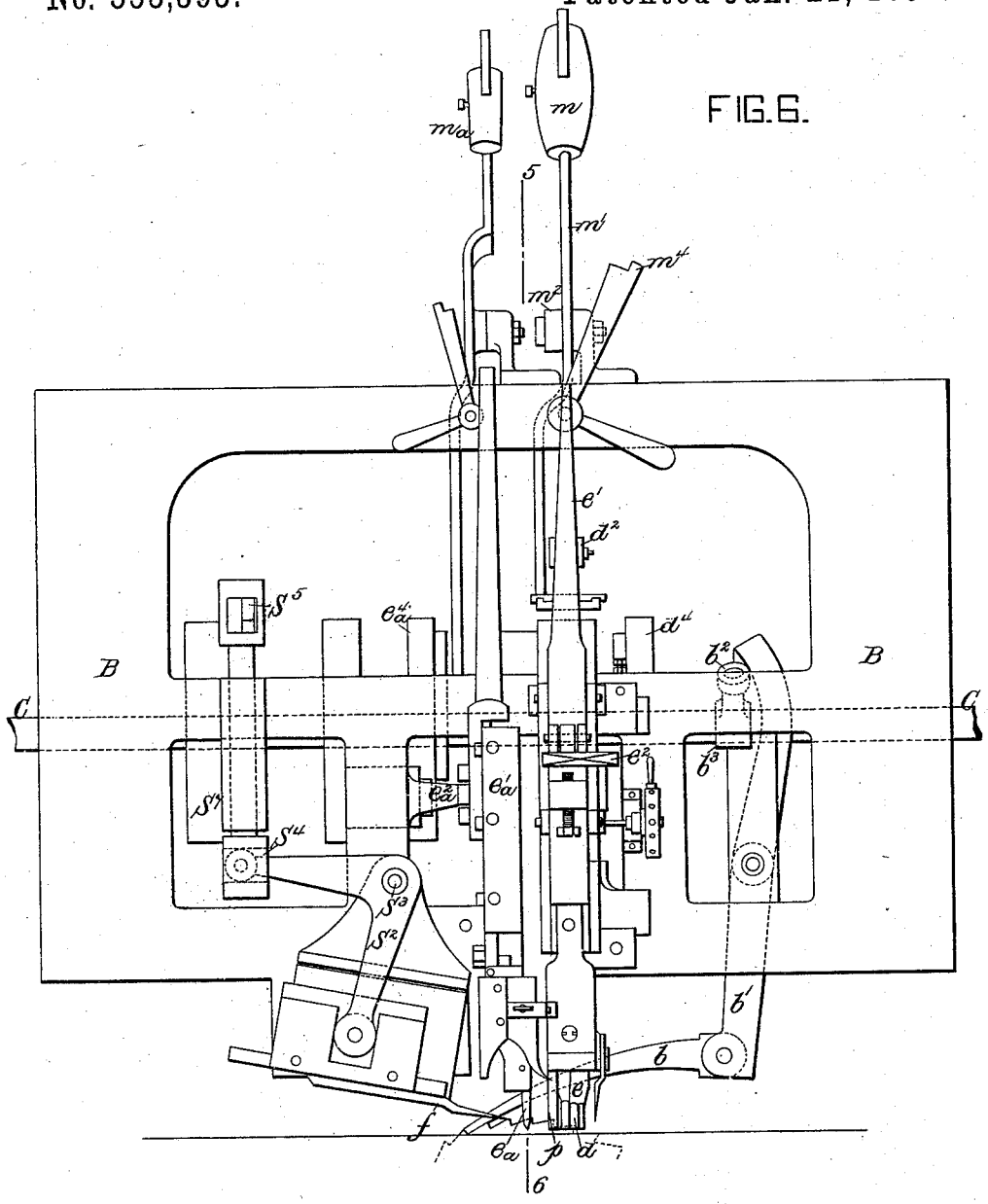
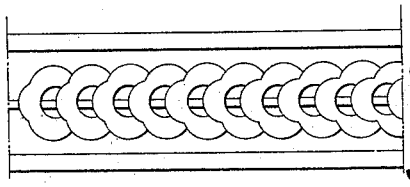


FIG. 4ª.



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L. C. H. CHARRIER.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

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FIG. 8.

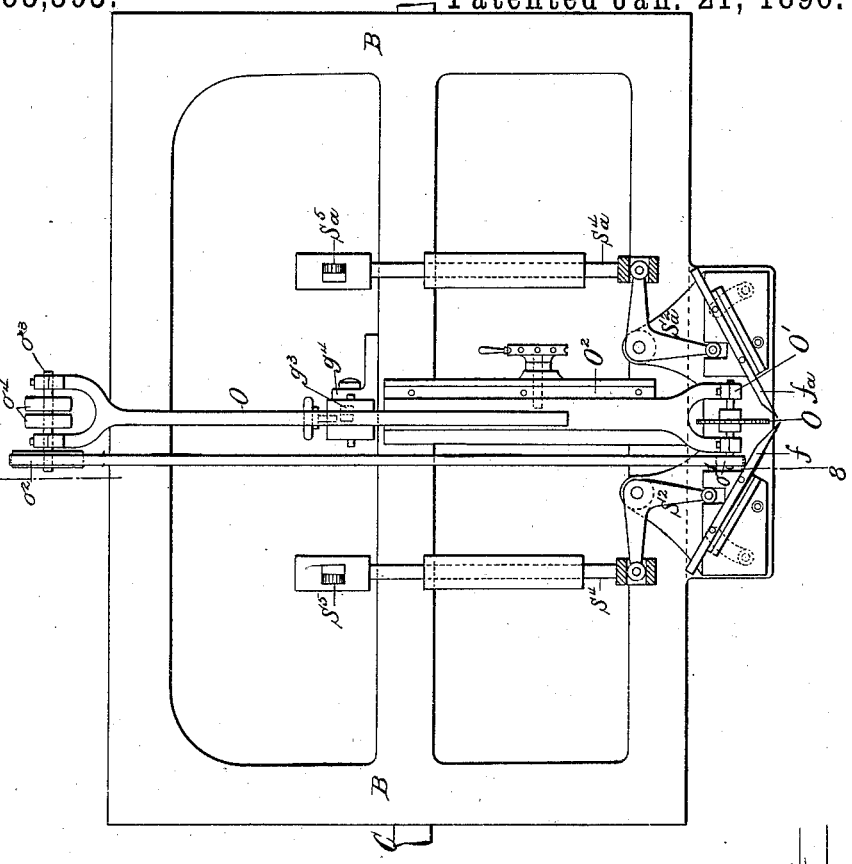
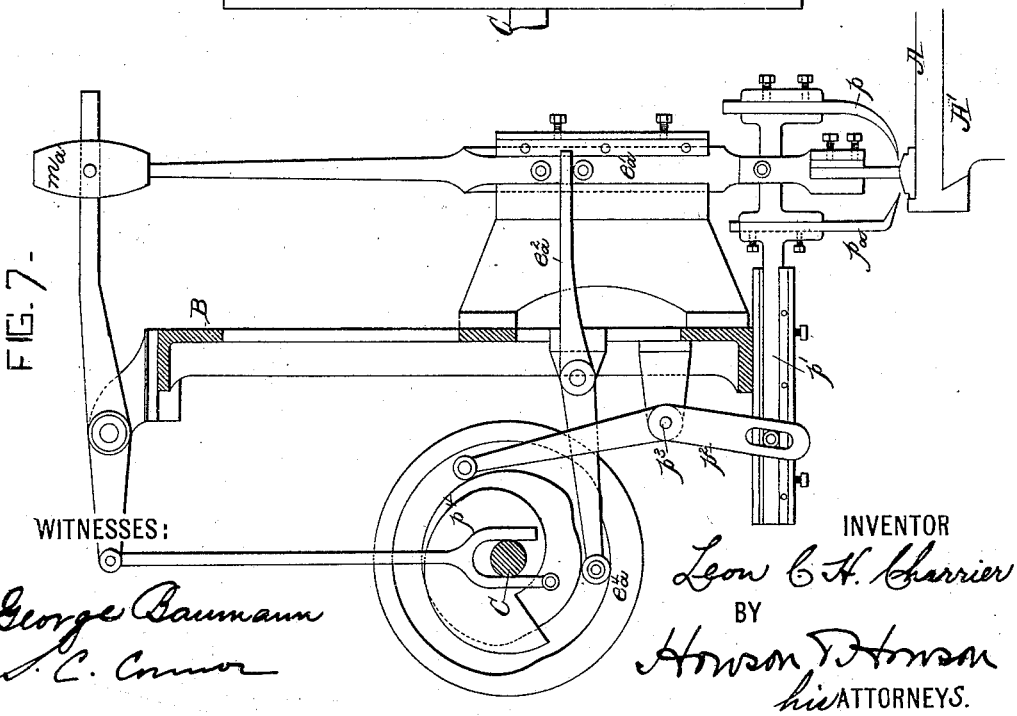


FIG. 7.



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No Model.)

9 Sheets—Sheet 7.

L. C. H. CHARRIER.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

No. 553,393. Patented Jan. 21, 1896.

FIG. 9.

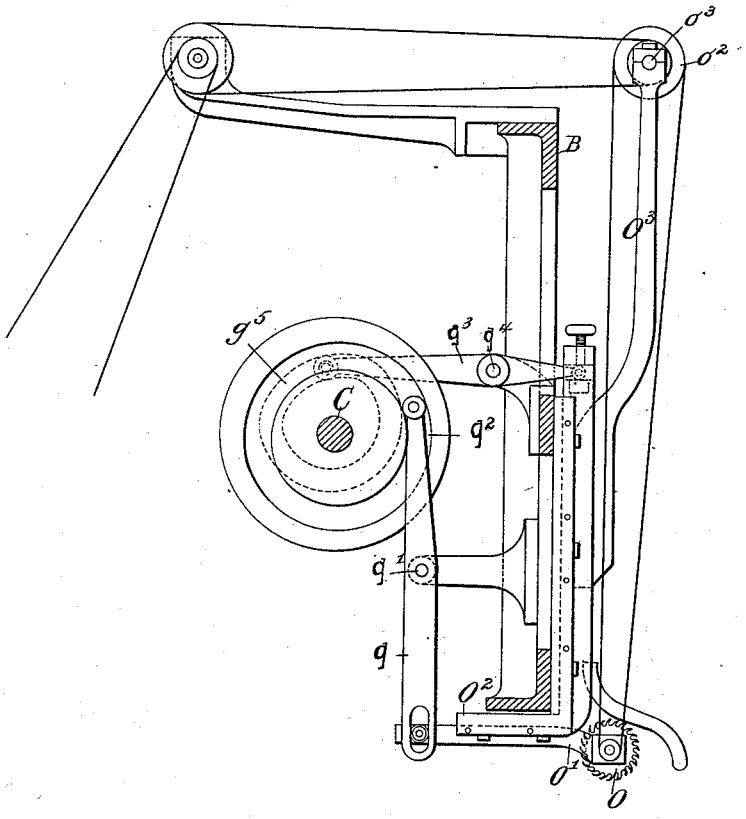


FIG. 5.^{a}

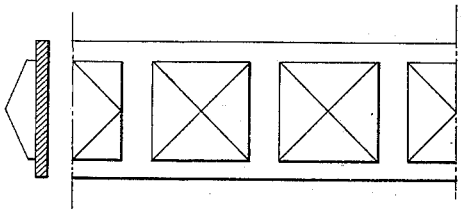
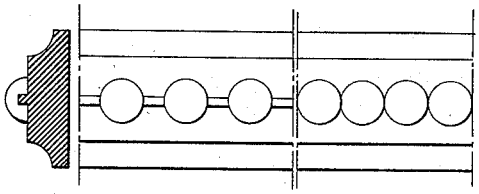


FIG. 6.^{a}



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MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

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FIG. 11.

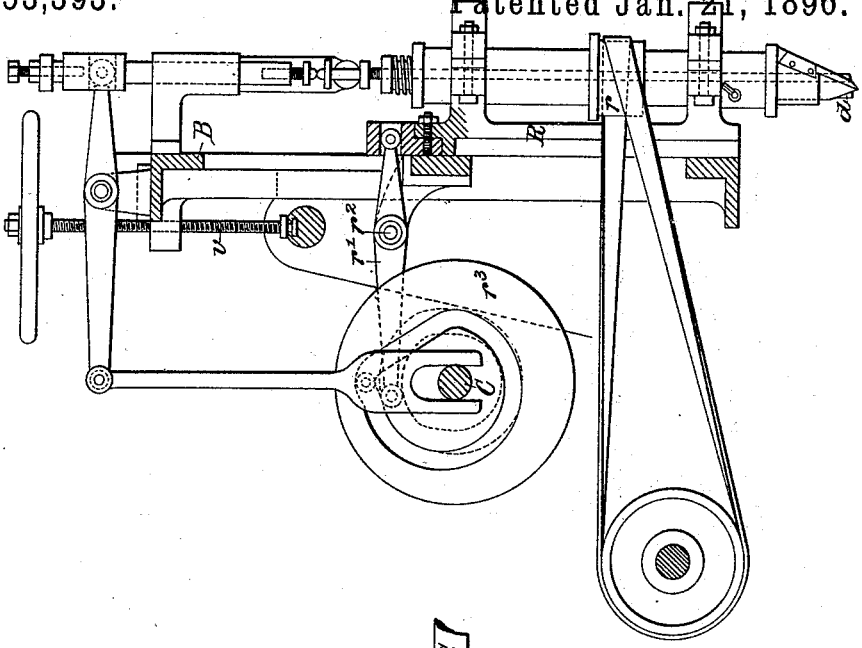
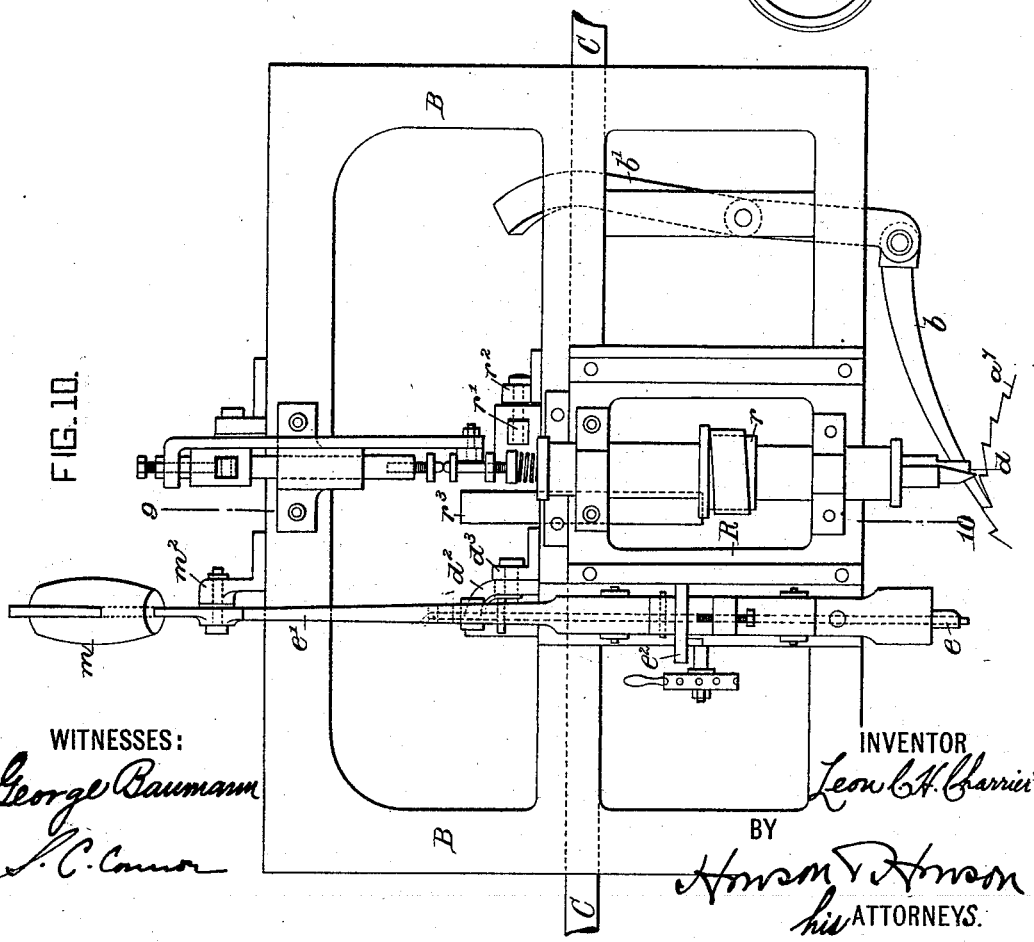


FIG. 10.



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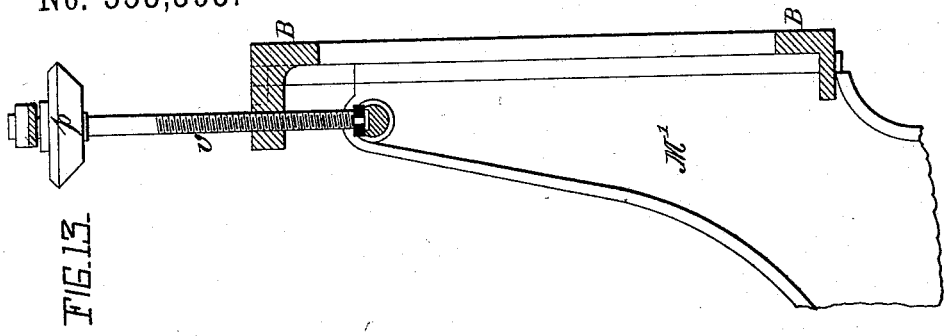

FIG. 13.

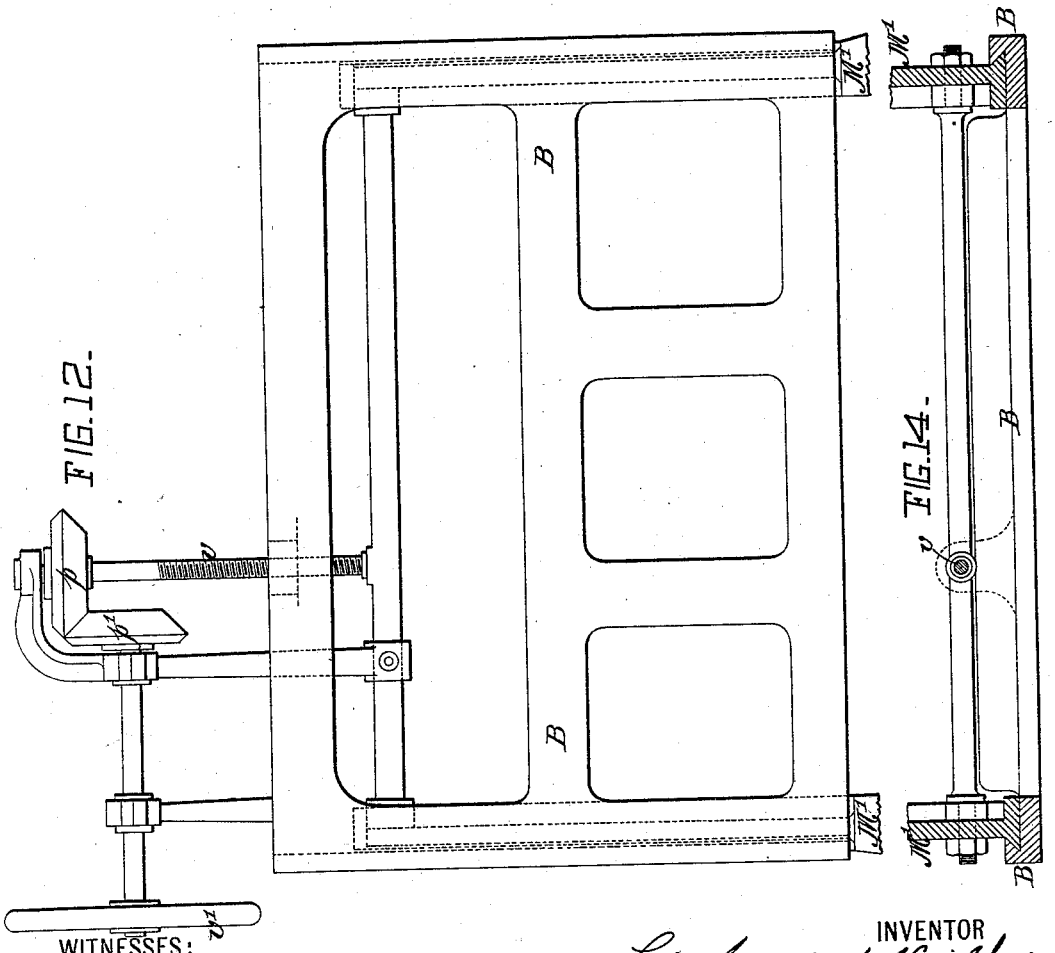

FIG. 12.

FIG. 14.

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UNITED STATES PATENT OFFICE.

LEON CONSTANT HENRI CHARRIER, OF VENDÔME, FRANCE.

MACHINE FOR CARVING STRAIGHT OR CURVED WOOD BLANKS AND MOLDINGS.

SPECIFICATION forming part of Letters Patent No. 553,393, dated January 21, 1896.

Application filed January 31, 1895. Serial No. 536,789. (No model.)

To all whom it may concern:

Be it known that I, LEON CONSTANT HENRI CHARRIER, manufacturer, a citizen of the Republic of France, residing in Vendôme, (Loir-et-Cher,) France, have invented a Machine for Carving Straight or Curved Wood Blanks and Moldings, of which the following is a specification.

This invention relates to a machine intended for carving or molding wood with or without beads, the moldings produced being either straight or curved and of any desired essence or style and provided with ornaments—such as hearts, eggs, bands, piasters, diamond points, leaves, pearl beads, and the like.

The invention more particularly concerns the arrangement and method of operation of the various tools performing the work; and it also relates to certain details of arrangement adapted to insure perfect regularity in the operation of the said tools.

The ornaments obtained by means of the machine in question are exactly similar to those generally produced by hand, having, however, the additional advantage over hand-labor of being perfectly regular and uniform, which is not always the case where the work is performed by hand. Besides, they present sharp edges, which differentiate them from those machine-made ornaments which have been produced hitherto, while their distinctive feature is a certain artistic style which none of the similar productions have presented up to the present time.

In order to leave no doubt as to the nature of construction of my machine and to enable an idea to be formed of the modifications of which it is capable, according to the particular kind of ornaments it is to produce, it is hereinafter described in detail, with reference to the accompanying drawings.

Figure 1 of the drawings represents a front view of the machine specially adapted for the production of hearts ("*raies de cœur*") and "eggs" or ovals, specimens of which are given in Figs. 1^a and 2^a. Fig. 2 is a cross-section on line 1 2, Fig. 1. Fig. 3 is another cross-section on line 3 4, Fig. 1. Fig. 4 shows a machine arranged for the production of bands or twists in the Louis XVI. style, a specimen of which is given in Fig. 3^a. Fig. 5 is a diagram showing the relative positions or directions of the tools to the wood to be worked or molded. Fig. 6 shows the machine as arranged for the production of "piasters," a specimen of which is represented in Fig. 4^a. Fig. 7 is a transverse section on line 5 6, Fig. 6. Fig. 8 shows the machine arranged for the production of diamond heads or points, a specimen of which is shown in Fig. 5^a. Fig. 9 is a cross-section on line 7 8, Fig. 8. Fig. 10 represents the machine as arranged for the production of pearl beads, a specimen of which is shown in Fig. 6^a; and Fig. 11 is a cross-section on line 9 10, Fig. 10. Figs. 12, 13, and 14 are detail views hereinafter explained.

Like letters of reference refer to like parts in all figures.

Referring to Figs. 1, 2, and 3 showing the main or characteristic type of machine, it will be seen that the wood to be carved, and which has the desired shape in section imparted to it beforehand, is mounted upon a horizontal carriage A, capable of being rendered movable both longitudinally and transversely, as shall be hereinafter more fully described, and that the tools, the number and description of which shall be indicated presently, are mounted upon a vertically-sliding carriage B capable of a desired vertical displacement; and it will further be seen that the whole of the driving-gear and mechanism for the conversion of motion are fitted onto the shaft C, which also carries a pulley D, over which passes a suitable driving belt or strap.

The carriage which receives the molding a to be carved or the "blank" consists of a plate A, movably arranged upon a second plate A'. The molding or blank a is retained upon the plate A by means of a number of screw-presses a' or in any other manner, and it rests upon a flange a^2. The plate A carries a rack a^3, with which engages a pinion a^4, the spindle a^5 of which has a handle a^6 and a ratchet-wheel a^7 fitted to it. A pawl b is mounted upon the end of a lever b' suitably pivoted, the opposite end of which being of a curved shape is acted upon by a roller b^2 carried by an arm b^3, secured to the driving-shaft C, which at each revolution causes the said lever to swing over and the ratchet-wheel a^7 to advance one or more tooth-spaces for the

purpose of producing the intermittent advancing motion of the carriage A. Although this method of advancement or feeding be preferred, it goes without saying that any other similar mechanism fitted onto the shaft C may be employed for the same purpose.

The plate A may, as will be seen, slide upon the other plate A′, and the latter is itself capable of sliding upon the frame M of the machine, so that it may be controlled transversely by means of a screw *c* passing through a nut which forms part of the said plate A′, and provided externally with a hand-wheel *c′*, by which means the required adjustment of these sliding parts is made. In addition to these two kinds of motion in the longitudinal and transverse directions a circular or elliptic movement may be imparted to the blank-carrying slide or carriage. It is sufficient for this purpose to arrange a third plate with a circular or elliptic rack acted upon by a pinion or operated in any other suitable manner. These various kinds of motion, especially the two first-mentioned ones, the longitudinal and transverse motions, are absolutely necessary for producing moldings or ornaments of any geometrical shape or outline.

The carriage holding the tools consists of a plate B, which slides vertically upon the bent piece or "swan-neck" M′ integral with the supporting-frame M of the machine. (See also Figs. 12, 13, and 14.) A screw *v* engaging in a nut of the said plate enables the same to be rendered capable of vertical motion, either by acting upon the said screw direct or by causing it to be operated by means of beveled pinion-gearing *p p′* and a hand-wheel *v′* arranged on one side. Upon the plate B there is provided a second plate B′ capable of horizontal motion, so that it may be adjusted as required.

The tools mounted upon the carriage B are six in number, viz: a presser *d*, a punch *e*, two gouges *f* f^a, and two chisels *g* g^a.

The presser *d* and punch *e* are concentric and arranged in the center of the two gouges and the two chisels. The presser *d* is mounted upon a rod *d′* suitably guided and connected by its top part or at any other convenient point of its surface with the end of a lever d^2, pivoted at d^3, and subjected to the action of the cam d^4, which, being keyed upon the shaft C, imparts to the said presser a reciprocating vertical movement with periods of rest at the termination of each stroke. The punch *e* at its cutting end or edge exactly represents the outlines of the ornament it is desired to obtain. It is here supposed to be adapted for the production of a heart or of an oval or egg. It envelops or surrounds the presser *d*, which is situated in the center thereof. The rod *e′* supporting it and whereon it is adjusted by means of a set-screw is suitably guided and connected with a lever e^2 pivoted at e^3 and operated by a cam e^4 wedged upon the shaft C has for its object to bring the said punch into contact with the blank *a*.

A hammer *m* secured to the end of a lever *m′*, oscillating at m^2 and subjected to the action of a cam m^3 also keyed onto the shaft C, is arranged to strike the rod *e*, when after having been raised by the cam m^3 it is released thereby. The punching or stamping operation is effected at the precise moment when the punch *e* comes into contact with the wood. Its object is to cut the fibers of the wood in following the outlines of the ornament so as to facilitate the subsequent operation of the gouges and chisels, and to impart to the ornament the desired section with sharp and neatly-delineated edge lines.

The operation of the hammer may be interrupted by means of an oscillating lever m^4, which may be brought into the plane of descent of the said hammer. The gouges *f* f^a are arranged symmetrically on each side of the presser and punch, their shape in section and size agreeing with the shape or configuration of the ornament to be carved. Each is adjusted in a suitable manner upon a segment *s* (s^a) pivoted at *s′* (s'^a) upon a block *n* capable of vertical motion, as will be seen presently. A double-arm lever s^2 (s^{2a}) is pivoted at s^3 (s^{3a}), one of the arms of which engages in a groove in the said segment *s* (s^a), while its other arm engages in a slot or window provided in the lower portion of a rod s^4 (s^{4a}) suitably guided and connected with a lever s^5 (s^{5a}), oscillating at s^6 (s^{6a}), actuated by a cam s^7 (s^{7a}) keyed onto the shaft C. Under the influence of this cam s^7 (s^{7a}) the segment *s* (s^a) describes an arc of a circle about the point *s′* (s'^a) and causes the gouge *f* (f^a) to describe the same arc of a circle as it is carving the central portion of the arc or oval in the wood, Figs. 1^a and 2^a. It will be understood that the shape in section or profile of the gouges must agree in each case with the form or nature of the ornament to be produced.

The block *n* carrying the joints or pivots *s* (s^a) is suitably guided by means of an attachment *n′* forming part of the swan-neck M′ and is suspended from the end of a lever n^2 operated at its opposite end by a cam n^3 keyed onto the shaft C. The vertical movement of this block has for its object to raise the segmental pivots *s* (s^a), and consequently, also, the gouges *f* (f^a) for the purpose of enabling the carriage supporting the blank to be carved to advance without there being any friction between the said gouges and the wood. The chisels *g* and g^a are mounted adjustably in tool-holders fitted respectively within supports *g′* g'^a, where they are capable of sliding. These tool-holders have each an inclined slot in which engages the terminal pin of a rod g^2 (g^{2a}) fixed into another rod s^4 (s^{4a}). In this manner the descent of the rods s^4 (s^{4a}) causes the chisels *g* g^a as they are carving another portion of the heart, Fig. 1^a, to advance.

Such being the construction of the improved wood-carving machine its operation is as follows: The blank a to be carved being a piece of wood of suitable shape in section, molded or otherwise cut out beforehand, is placed upon the carriage A and the machine is set in operation by means of any suitable clutch or coupling device. By reason of the configuration of the various cams d^4, e^4, m^3, s^7 and s^{7a}, the said tools mentioned before—viz., the presser, punch, gouges and chisels—come into operation respectively in the following manner: First of all the presser d is lowered by the action of its cam d^4 so as to render the wood a perfectly motionless and steady. The punch e is then lowered by the action of its cam e^4 into contact with the wood a, and when this contact takes place the hammer m, released by its cam m^3, descends upon the rod of the said punch, which cuts the wood along the outlines of the desired ornament, (a heart or an oval as the case may.) After this outline has been so cut the punch rises, while during this movement the presser remains in contact with the wood, so as always to keep it steady and enable the gouge to be lifted without any displacements of the blank. It is not till after the gouge has been thus disengaged that the presser rises in its turn. At this moment the two gouges f and f^a successively enter under the influence of their respective cams s^7 and s^{7a} to cut the blank at the parts where the top and middle portions of the desired ornament should be formed, (whether the ornament be a heart, Fig. 1^a, or an egg, Fig. 2^a.) At the same moment the chisels g and g^a also act each in succession for the purpose of cutting the upper and lateral parts of the ornament in the blank, so as to form its point or ridge as the case may be. After the gouges and chisels have completed their respective operations the said gouges are slightly raised by means of the block m, which carries the pivots of their segments s and s^a, so that the wood may move forward longitudinally. This advancement of the wood is produced by the click device a^{7b} set in operation by the cam b^2. The distance thus traveled is equal to the space which should be left between two consecutive or adjacent ornaments. When the blank has once been fed forward in this manner the operations described above are repeated, and so on until the opposite end of the wood molding or blank a is reached.

It will be understood that the machine comprises all means of adjustment for enabling the extent of motion in each case to be adjusted as required, as also the position of the tools, their distance from the wood to be carved and the stroke of the carriage supporting such wood to be regulated so that it may be possible to carve hearts or ovals of various dimensions upon moldings or blanks of greater or less depth or thickness.

It will also be understood that the configuration and size of the tool-blades should correspond to the nature of the ornament to be produced, and, lastly, it will be understood that the construction of the machine may be reversed, or, in other words, that the carriage A may be arranged vertically, while the carriage B would be placed horizontally. At all events the carriage A may be stationary, while the carriage B supporting the tools may be capable of displacement in relation to the wood which is kept steady, so as to carry the tools successively from one piece of the ornament to be produced to the next.

Having stated this much in regard to the general arrangement of the machine I shall now proceed to examine the various modifications which may be made in this type of machine according as it is desired to produce bands, piasters, diamond points, pearl beads or any of the other usual ornaments, as applied to moldings, no matter whether the moldings are straight or curved.

When it is desired to carve bands, Fig. 3^a, the presser d, punch e, and gouges f and f^a, together with their operating mechanism, are retained, as indicated in Fig. 4, wherein these several parts are designated by the same letters, as before, though the greater part of the pieces that are retained are not shown. The difference consists in the way in which the cutting-edges of the punch and gouges are cut or ground, their shape corresponding in each case to the configuration of the band to be formed or carved; also, in the combination with the central presser d of two lateral pressers d^a and d^b acting on each side of the punch e, and the rods d'^a and d'^b are connected to one and the same lever d^5 connected in its turn to the lever d^6, which, similarly to the lever d^2 of the central presser, is operated by a cam of the same nature as d^4, which forms part of the fittings of the gouges f and f^a, which, instead of being secured to the swinging segments s and s^a, are mounted and adapted for sliding motion in fixed supports, and, lastly, in the relative positions or directions of the gouges which, instead of being situated in the plane of the carriage B, are arranged in an oblique plane or inclined in relation to the said carriage, as shown in Fig. 5, for the purpose of acting in the direction of the incline of the convolutions of the band to be carved.

Figs. 5 and 4^{bis} also show how the gouges f and f^a may have their lever s^2 and s^{2a} connected to the rods s^4 and s^{4a}, situated one behind the other in front of the central presser and the punch and connected to s and s^{5a}, operated as before stated from the cams s^7 and s^{7a} of the shaft C.

To carve piasters, Fig. 4^a, the machine, Figs. 6 and 7, should always comprise a central presser d and a punch e arranged and operated as before stated, but the shape and section of which correspond to the particular ornament they are to produce. One of the gouges f and f^a is omitted and the remaining one is arranged and operated as described

above, with a view to forming the top of each of the piasters. Beside the punch e there is arranged a second punch e^a, the rod e'^a of which, being suitably guided, is operated by a lever e^{2a} subject to the action of a cam e^{4a}, and upon the head of which is adapted to strike the hammer m^a, actuated in the same manner as the hammer m of the central punch. This additional punch has for its object to strike the wood or to drive it inward at the central portion of each of the piasters. In addition to this the removal of the shavings resulting from the operation of the gouge f is effected by means of the hooks p and p^a secured to a horizontal rod p' adapted to slide in a fixed slideway and connected with a lever p^2 oscillating at p^3 and submitted to the action of a cam p^4 keyed onto the shaft C and imparting to the said hooks a reciprocating movement.

To form diamond points, Fig. 5a, the machine, Figs. 8 and 9, always comprises two gouges $f f^a$, actuated by levers s^{2a} connected by the rods s^4 s^{4a} and levers s^5 s^{5a} to cams s^7 s^{7a}; but the presser d and punch is replaced, as shown in Figs. 8 and 9, by a small circular saw O mounted upon a horizontal support O′ fitted for sliding motion within another support O^2 capable of being moved vertically. The saw O receives its rotary motion from a belt passing over both the pulley o' keyed onto the shaft of the saw and the pulley o^2, the shaft or spindle o^3 of which is maintained at the end of the support O^3 secured onto the other support O^2. The shaft or spindle o^3 is operated by means of another strap passing over the pulley o^4 or in any other suitable manner. The support O′ is connected by a lever q pivoted at q' and engaging with a cam q^2 keyed onto the shaft C. The support O^2 is connected by the lever q^3, also pivoted at q^4 and engaging with a cam q^5, also keyed onto the said shaft C. The combination of the supports O′ and O^2 and their driving-gear is such that the saw O is capable of performing a horizontal movement and a vertical movement. This saw O when lowered and drawn back produces a transverse cut in the wood, whereas when raised it may return to the front without touching the wood. The gouges f and f^a cut the wood on each side of the said saw-cut, whereby the diamond points are obtained.

It will be understood that by omitting one of the gouges and giving the wood a suitable shape in section there may be obtained by means of the same machine racks of wood capable of serving as supports for tablets or slabs for cabinet-making purposes.

To form pearl beads, Fig. 6a, the machine, Figs. 10 and 11, always comprises a central presser d and a punch e, with the only difference that the presser and punch, in this case, instead of being concentric are placed side by side, as shown in Fig. 10. The central presser is surrounded with tools adapted to roughly work the tops of the pearls, which are finished by means of the punch e. These tools are mounted upon a sleeve enveloping the central presser, upon which there is a pulley r, which, by means of a strap, imparts rotary motion to both the sleeve and the tools performing the above-mentioned rough work, making them turn about the presser. The sleeve in question is supported by bearings forming part of a carriage R adapted to slide upon the carriage B, and connected by a lever r' pivoted at r^2 to a cam r^3 keyed onto the shaft C.

In all the foregoing modifications, whether it be desired to make bands, piasters, diamond points or pearl beads, the machine in all cases operates as above described—that is to say, the presser descends first, and the punch, except as regards the pearl beads, next cuts the wood along the outlines of the ornament required. Then the ascent of the said punch is followed by a rising movement of the presser, and the tools (such as the gouges or chisels of suitable shape) then either simultaneously or successively operate upon the wood at its upper portion, so as to shape and finish the tops of the ornament first cut out, whereupon the carriage supporting the blank advances a distance equal to the desired space between each piece or figure of the proposed ornament.

I claim—

1. A machine for carving straight or curved wood blanks and moldings to produce the usual ornaments thereon, such as "hearts," "eggs," bands or garlands in the Louis XVI. style "piasters," "diamond points," pearl-beads or the like, said machine comprising a carriage for the blank, means for automatically imparting intermittent feed movement to the carriage, a tool for cutting the outline of the figure first, and tools for shaping and finishing the ornaments, and mechanism for automatically moving the cutting tools in contact with the blank, in directions to give the desired configuration, and moving the tools away from the blank while it is being fed forward, substantially as set forth.

2. In a machine for carving ornaments on wood blanks, the combination of a presser adapted to retain the blank in position while it is being partly worked, a punch adapted to cut the wood along the outlines of the ornament to be produced, such cut taking place while the blank is being held by the presser, and tools (such as gouges and chisels) arranged symmetrically in relation to the presser and punch, to shape or finish the ornaments previously cut, substantially as specified.

3. In a machine for carving ornaments on wood blanks, the combination of a presser to hold the blank, a punch adapted to cut the outline of the ornament to be produced, and gouges, and a carriage for carrying the wood blank, with means for automatically advancing the blank carriage intermittently in ac-

cordance with the action of the said tools, substantially as set forth.

4. In a machine for carving ornaments on wood blanks, the combination of a blank carriage, and an automatic intermittent feed motion therefor, with a presser *d*, a punch *e*, gouges *f*, f^a and chisels *g*, g^a, substantially as and for the purpose set forth.

5. In a machine for carving ornaments on wood blanks, the combination of a wood supporting carriage A adapted to advance intermittently, a presser *d*, a punch *e*, gouges *f* and f^a arranged at an angle to the direction of motion of the said wood supporting carriage A and additional pressers d^a and d^e, all substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEON CONSTANT HENRI CHARRIER.

Witnesses:
LÉON FRANCKENS,
CLYDE SHROPSHIRE.