

J. M. CARPENTER.

Machines for Threading Wood Screws.

No. 134,360.

Patented Dec. 31, 1872.

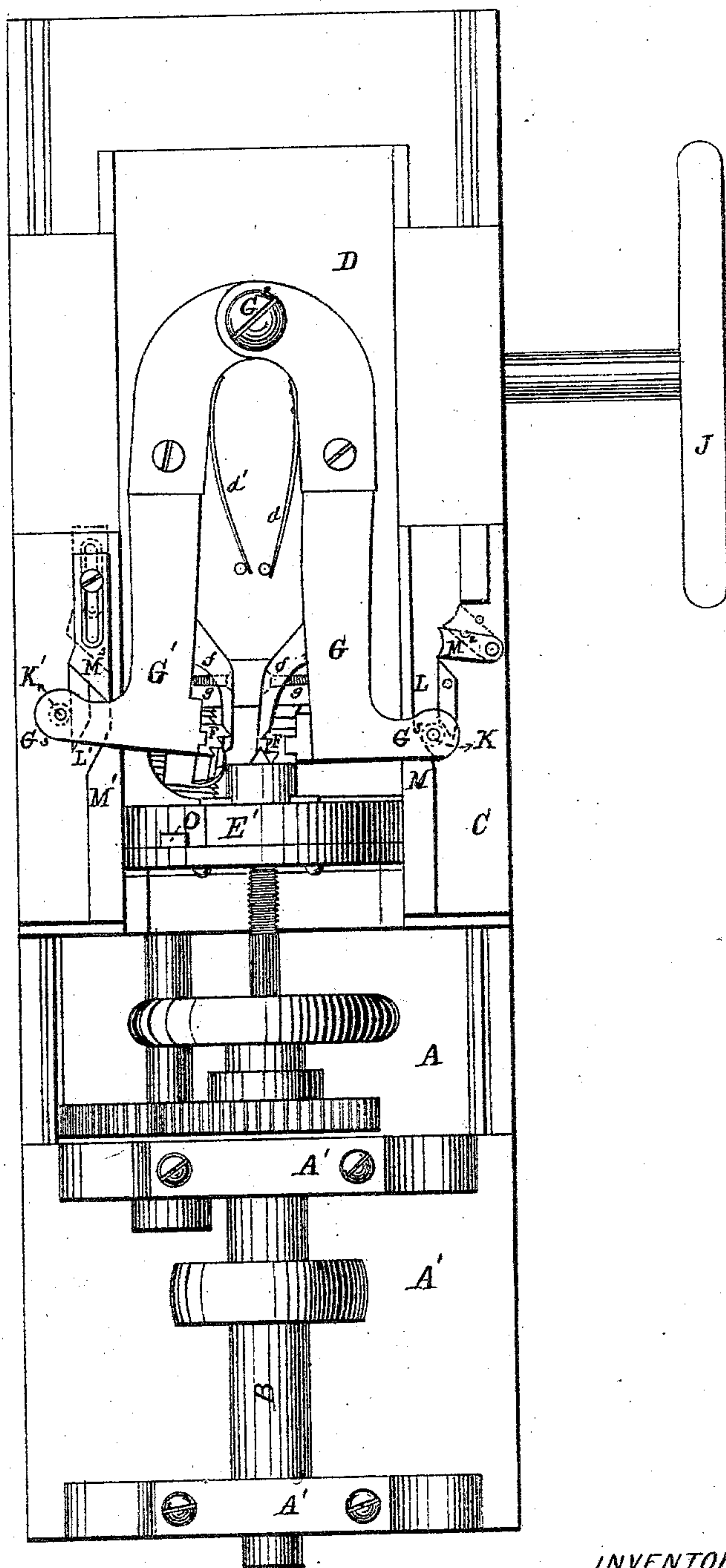


FIG. 1.

WITNESSES.

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J. H. Royce

INVENTOR.

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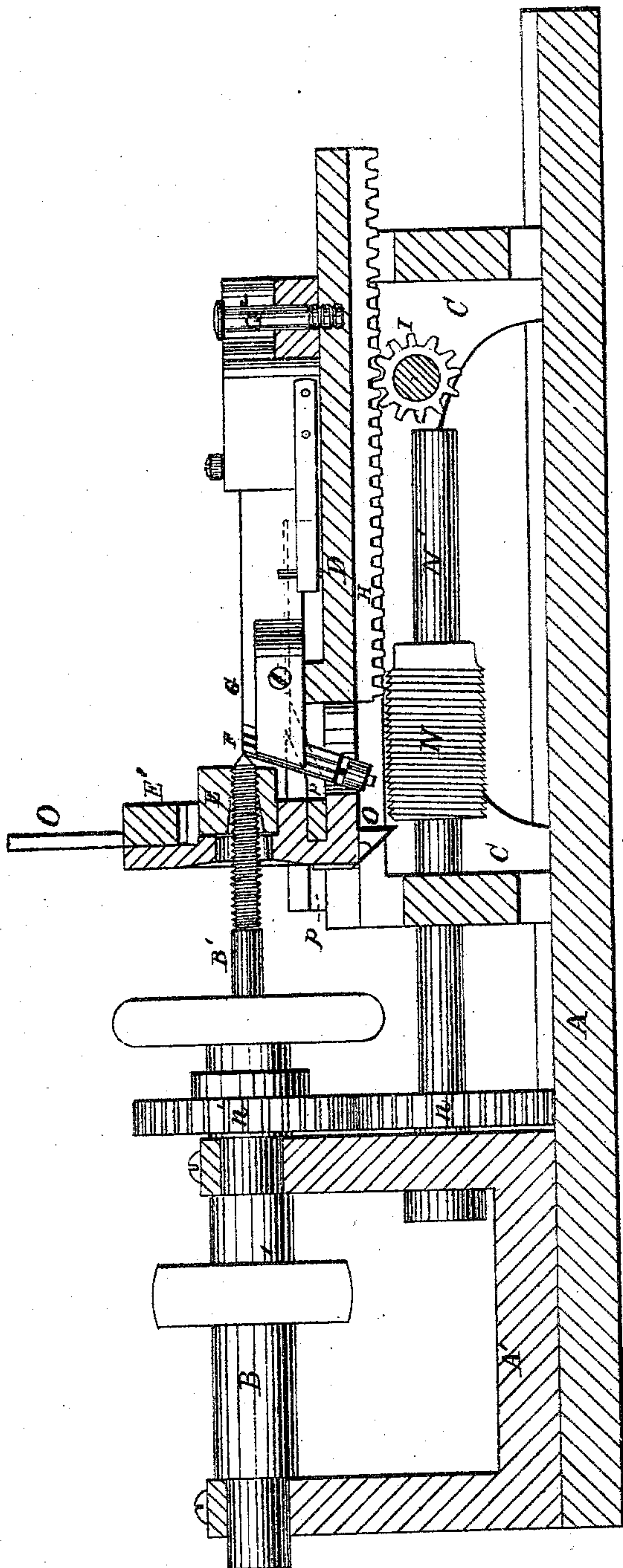


FIG. 2.

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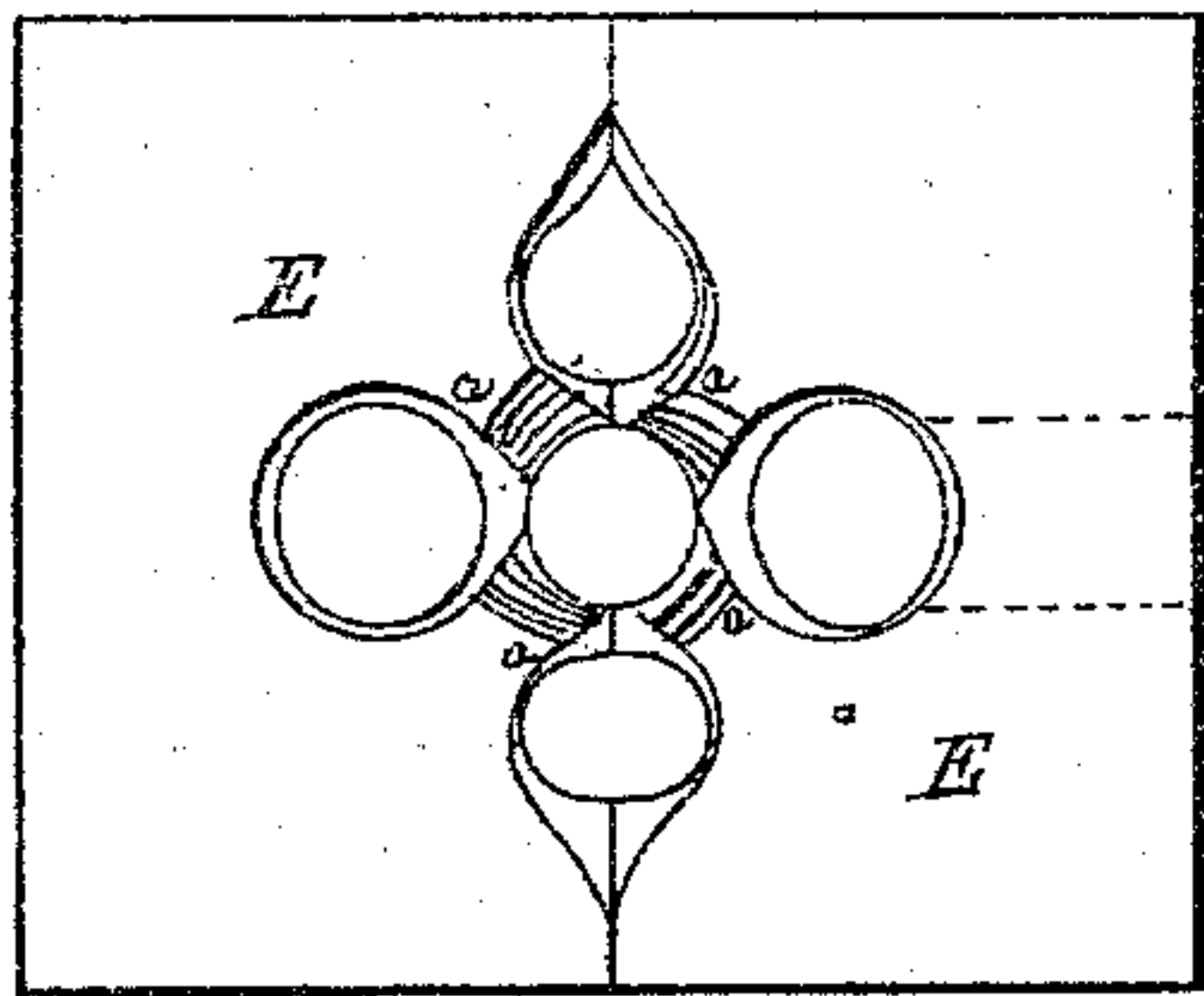


FIG. 4.

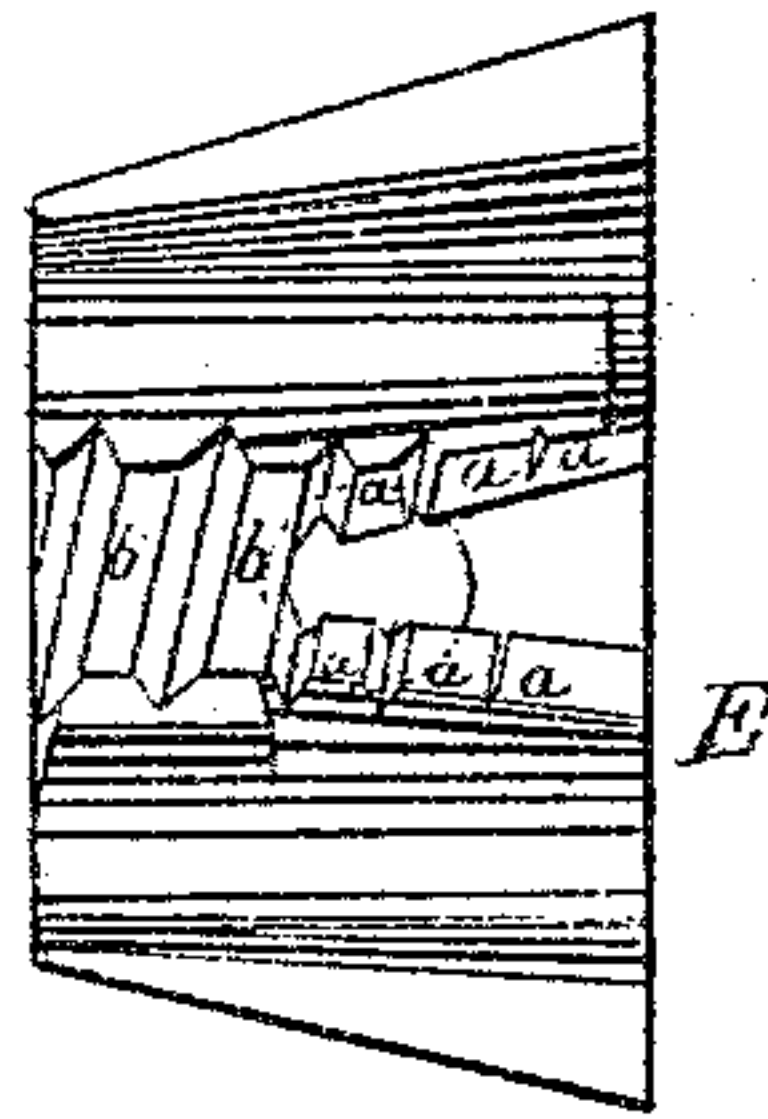


FIG. 5.

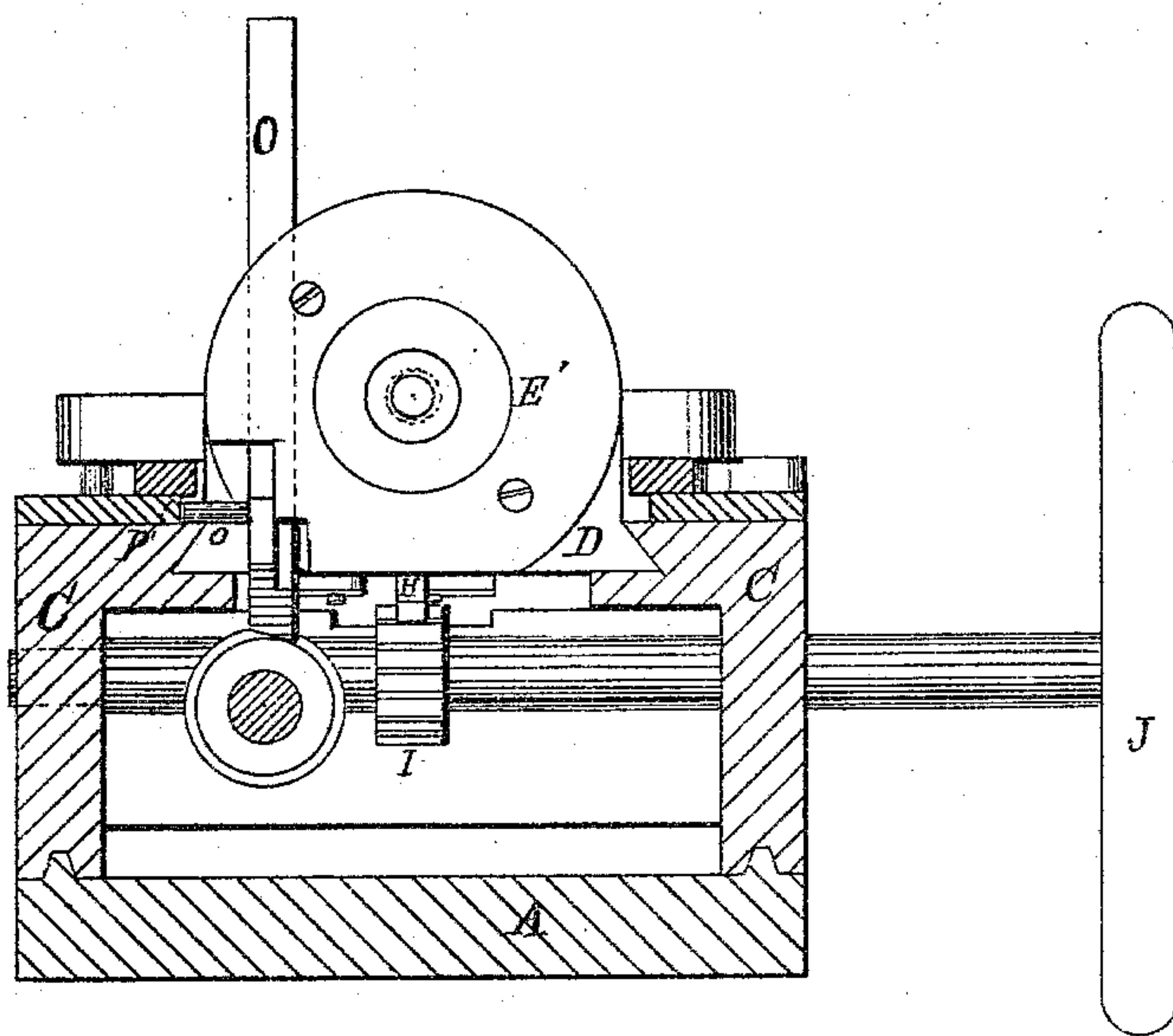


FIG. 3.

WITNESSES.

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UNITED STATES PATENT OFFICE.

JAMES M. CARPENTER, OF PAWTUCKET, RHODE ISLAND.

IMPROVEMENT IN MACHINES FOR THREADING WOOD-SCREWS.

Specification forming part of Letters Patent No. 134,360, dated December 31, 1872.

To all whom it may concern:

Be it known that I, JAMES M. CARPENTER, of Pawtucket, county of Providence, and State of Rhode Island, have invented certain Improvements in Machines for Cutting Screws, of which the following is a specification:

My improvements more especially relate to the construction of machinery for cutting gimlet-points on wood-screws where the body of the screw is cut by dies and the gimlet-point is cut by tools which move toward and from the axis of the screw in a manner similar to that which is the subject of Letters Patent granted to me October 17, 1871.

My first improvement relates to the method of forming the dies in such a machine to remove a difficulty that I have found in practice.

In order to cut a proper screw-thread for wood by passing the dies once over it, a large amount of the stock has to be removed between the screw-threads, which imposes a great torsional strain upon the blank, and to meet this the dies are usually made trumpet-mouthed, and their cutting-edges are made with considerable clearance, so called, so as to cut as freely as possible. When the dies are thus formed it is found that after the screw has been cut by them it will be loose in them, the elasticity of the iron and the draft of the cutting-edges of the dies having the effect to make the screw a little smaller than the opening of the dies. But in using such dies, in combination with tools moving radially to cut the gimlet-point of the screw, it is very desirable that the screw should be held very firmly to enable the pointing-tools to do their work neatly.

To obviate this objection is the purpose of this improvement; which consists in forming the conical part of the dies with a series of cutting-threads, in combination with one or more holding-threads, not made with cutting-edges, by which the screw is firmly held while its point is operated upon by the pointing-tools.

My second improvement also relates to the use of the trumpet-mouthed dies, so called, and is designed to obviate a difficulty which arises from the use of dies of that form. At the outer or entering side of such dies the thread is so nearly cut away and the cutting-edges are so broad that the blank is liable not to take the thread when the blank is presented

to it, in which case the surface of the blank will be cut away without being drawn in, so that when the screw is afterward cut the threads at the junction of the point with the body will be defective by reason of such action. My improvement, therefore, consists in combining with such dies a leader that will act with the dies while the blank is entering them, and then be disengaged to allow the dies to form the screw and to be removed therefrom in the usual way.

My third improvement relates to a new method of arranging the pointing-tools, so called, so that two of them can be used in order to make a more perfect gimlet-point by dividing the work of forming the threads between a greater number of cutting-edges; and consists in combining with the dies that cut the body of the screw, or the equivalent thereof, two tool-holders and tools, and the guiding-formers for the same, for cutting the screw on the point, one of which tools partially cuts the point in running the dies onto the blank, and the other of which finishes the point when the dies are backed off, as will be described.

In the drawing, Figure 1 is a plan of the machine; Fig. 2 is a vertical longitudinal section; Fig. 3 is a transverse section; and Figs. 4 and 5 are full-size views of the improved dies.

A is the bed of the machine, and A' the head-stock that carries the mandrel B which turns the screw-blank B', and is driven in both directions, in any of the modes usually practiced in screw-cutting machines. C is a frame or bed which slides on ways on the bed A, and is secured thereto in any usual way, to adapt the machine to the length of screw to be made. Upon this frame the carriage D slides lengthwise in suitable guides, which carries the die-stock E' and the pointing-tools F and F' and their tool-holders G and G', as is shown. The carriage D is moved forward and back by hand by the rack H and pinion I upon the shaft of the hand-wheel J, which revolves in bearings in the bed C for the purpose of removing the finished screw and introducing a fresh blank. The dies E are of a peculiar construction to meet a condition of things that has been stated, and are shown in full size in Figs. 4 and 5. They are made trumpet-mouthed, as shown, and also

made with four series of cutting-edges, *a a a*, &c., which cut away the material between the threads of the screw and bring it to the proper size; but the threads *b b* are not made with cutting-edges, but are smooth and of such internal diameter that the screw formed by the cutting part of the dies will enter them with sufficient compression to hold the screw firm so as to sustain the strain of the pointing-tools without yielding, which otherwise might spoil the gimlet-point of the screw, as I have found by practice. These dies may be held in the die-stock *E'* in any usual way. The two tool-holders *G G'* are attached to the carriage *D* and swing upon the bolt *G²*. Their ends next to the dies are provided with seats for holding the pointing-tools *F F'*, by means of the clamps *f f* and screws *g g*, in an obvious manner.

The pointing-tools *F F'* are constructed and operate like that described in Letters Patent granted to me April 2, 1872, and are directed by guide grooves or cams in the same way.

G³ G³ are arms extending outward upon the tool-holders *G* and *G'*, which carry guide-pins *K K'*, which work in the pattern or guide grooves *L L'* formed in the pieces *M M'*, respectively, which are secured to the top of the frame *C*. One of the grooves *L* is provided with a swinging directing-piece, *M²*, which, when the carriage *D* is run back, is moved to the position shown by the dotted lines, and directs the guide-pin *K* into the inner part of the groove *L*, and, after it passes the pin *M²*, is swung outward against the piece by the spring *d*, so that when the carriage is run forward the pin *M²* is swung to the position shown by the full lines, and directs the pin *K* into the inner guide groove *L*, and the other groove *L'* has a sliding directing-piece, *M³*, which slides back to the position shown by the dotted lines, and directs the guide-pin *K'* into the outer part of its guide-groove. By the action of the spring *d'* the pin *K'* falls behind the projection *k* on the piece *M³*, and when the carriage is moved forward carries the pin forward also, and closes the inclined groove, and compels the pin *K'* to pass upon the outside, as is shown in the drawing.

These movements of the tool-holders are also assisted by the springs *d d'*, which are attached to the tool-holders, respectively, as shown, and press them both toward the front of the machine.

N is the leader, which has the pitch of its screw to correspond with that of the screw to be cut, and also has its thread made vertical on its working-face, and in this thread a slide, *O*, works, which slides up and down in the die-stock, and is a substitute for a nut.

The leader *N* is made so as to be adjusted upon the shaft *N'* to accommodate the length of the screw to be cut, and is driven by gears *n n'* from the mandrel.

From the back side of the slide *O* a pin, *o*, projects, and works in the groove *p*, Figs. 2

and 3, by which the slide *O* is engaged with and disengaged from the leader when the pin *o* passes through the inclined part of the groove *p*, as shown by the dotted lines in Fig. 2, which raises and lowers the slide in an obvious manner.

The operation of the machine is as follows: The carriage, *D* carrying the die-stock and tool-holders, is run back by the hand-wheel *J*, and the blank previously pointed is placed in the socket of the mandrel *B*. The carriage is then brought up by the hand-wheel until the pin *o* enters the inclined part of its groove *p*, which lowers the slide *O* so that its lower end engages with the screw-thread on the leader *N*, and carries the carriage *D* and its attachments along until the dies have passed onto the point of the blank. The engagement of the slide *O* with the leader takes place just before the point of the screw comes in contact with the dies. After the dies are fully engaged with the blank the slide *O* passes off from the end of the leader, and the forward motion of the carriage *D* is then produced by the screw blank and dies. When a sufficient length of screw is cut the motion of the mandrel *B* is reversed, and the carriage is thereby carried back and the slide *O* enters the screw of the leader, which continues the movement of the carriage until the dies have passed off from the point of the screw and the incline of the groove *p* has raised the slide *O* out of the threads of the leader, when the carriage is free to be moved back by hand, and is ready to repeat the operation. The motion of the mandrel *B* in running backward is about three times as fast as when running forward to cut the screw, and the pointing-tool *F'*, which finishes the point when running off, is set so as to take lighter cuts or shavings than the other tool, so as to favor the increased weakness of the point and give a neater finish to the screw.

What I claim is—

1. The trumpet-mouthed dies having cutting and holding threads, as described, in combination with the pointing tool or tools, substantially as described.

2. The combination of trumpet-mouthed dies with a leader operating as described to cause the screw-blank to enter the dies properly and to be disengaged from the dies so soon as the dies have fully engaged with the blank, substantially as described.

3. The combination of the dies for cutting the body of the screw with two pointing-tools and two patterns or formers to guide the same, so arranged that one of said tools shall act when the screw-blank is running into the dies, and the other when the screw is running out, substantially as described.

Executed June 1, 1872.

JAMES M. CARPENTER.

Witnesses:

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FRANK K. ROGERS.