(No Model.) 4 Sheets—Sheet 1.

O. C. BURDICT.

SCREW THREADING MACHINE.

No. 349,083. Patented Sept. 14, 1886.

Fig. 1.

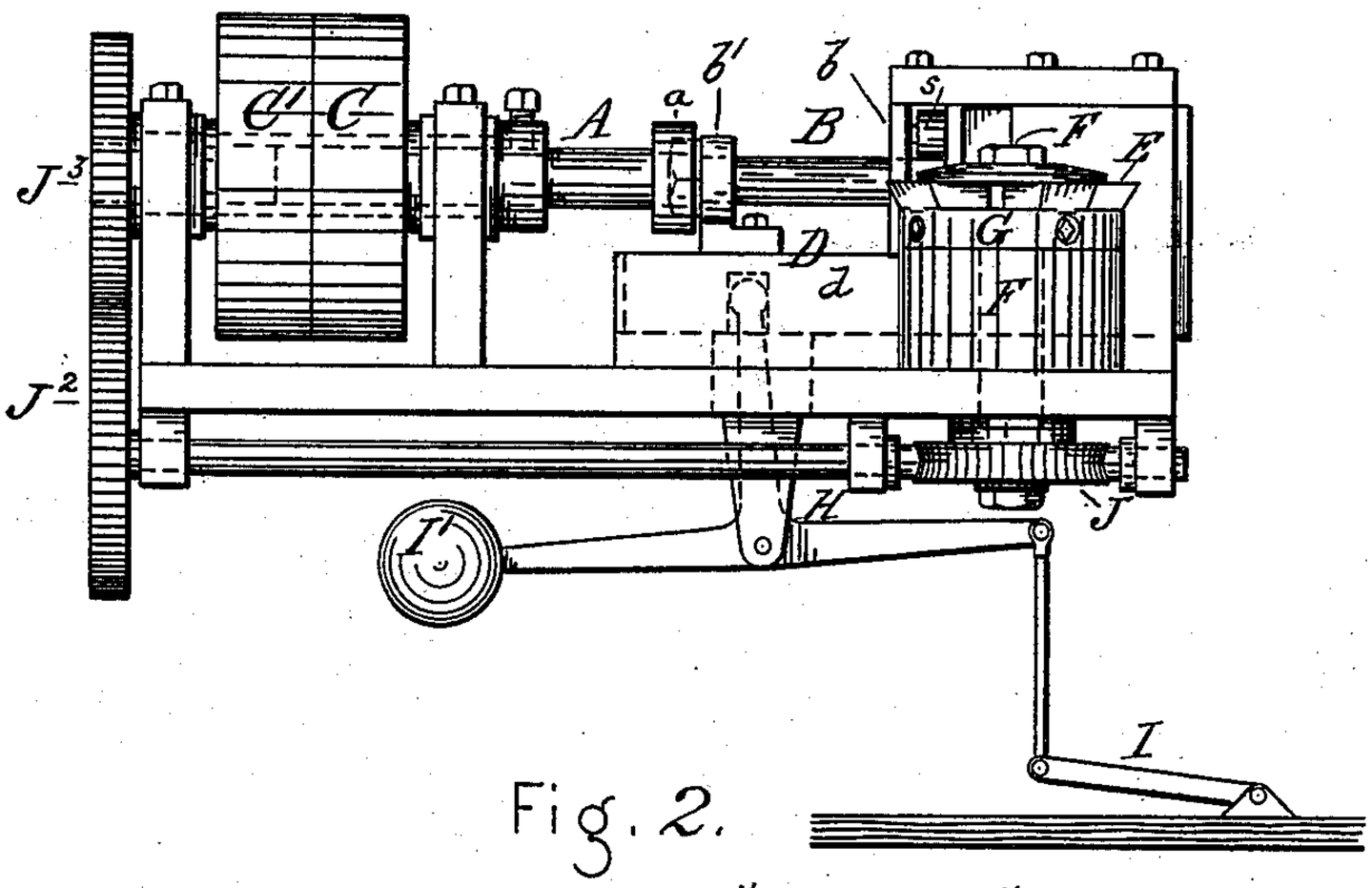
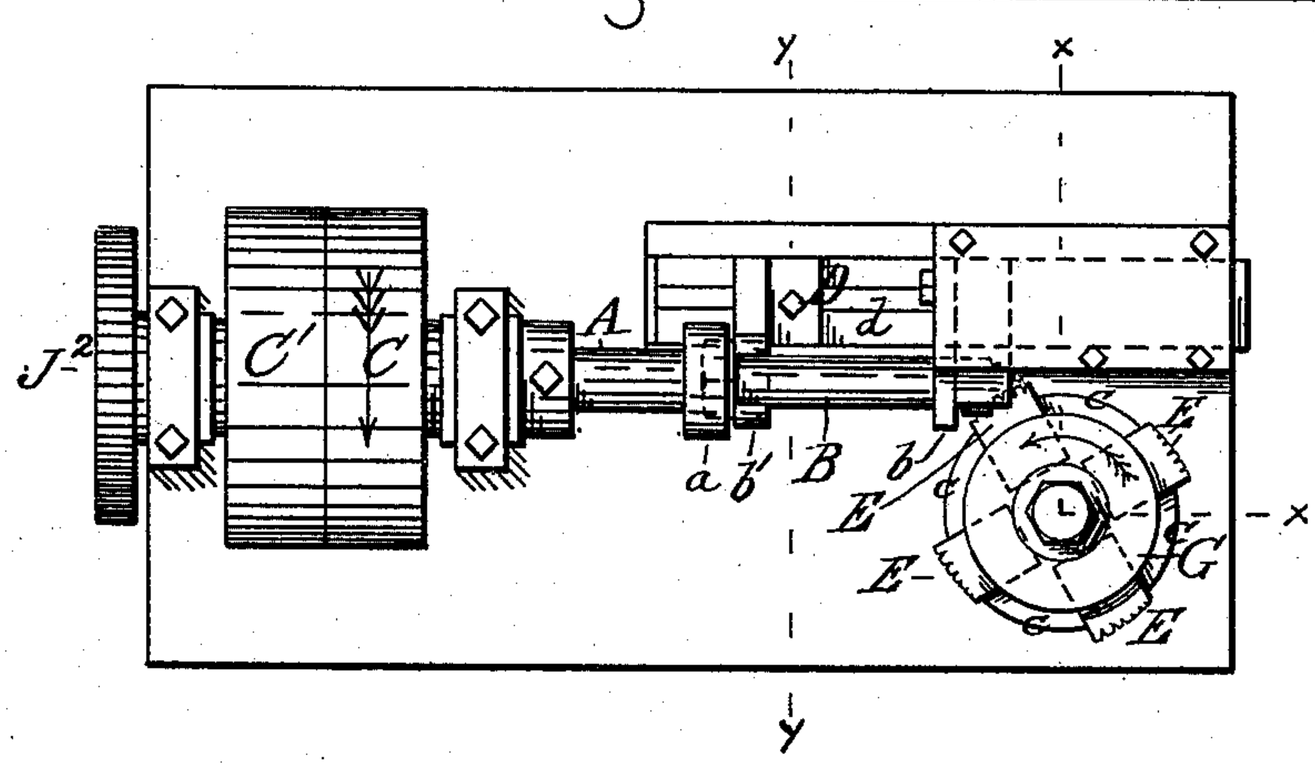


Fig. 2.



WITNESSES

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4 Sheets—Sheet 2.

O. C. BURDICT.

SCREW THREADING MACHINE.

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Fig. 7.

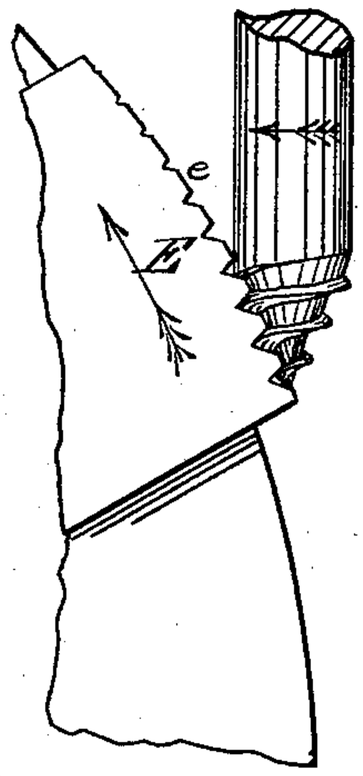

Fig. 3.

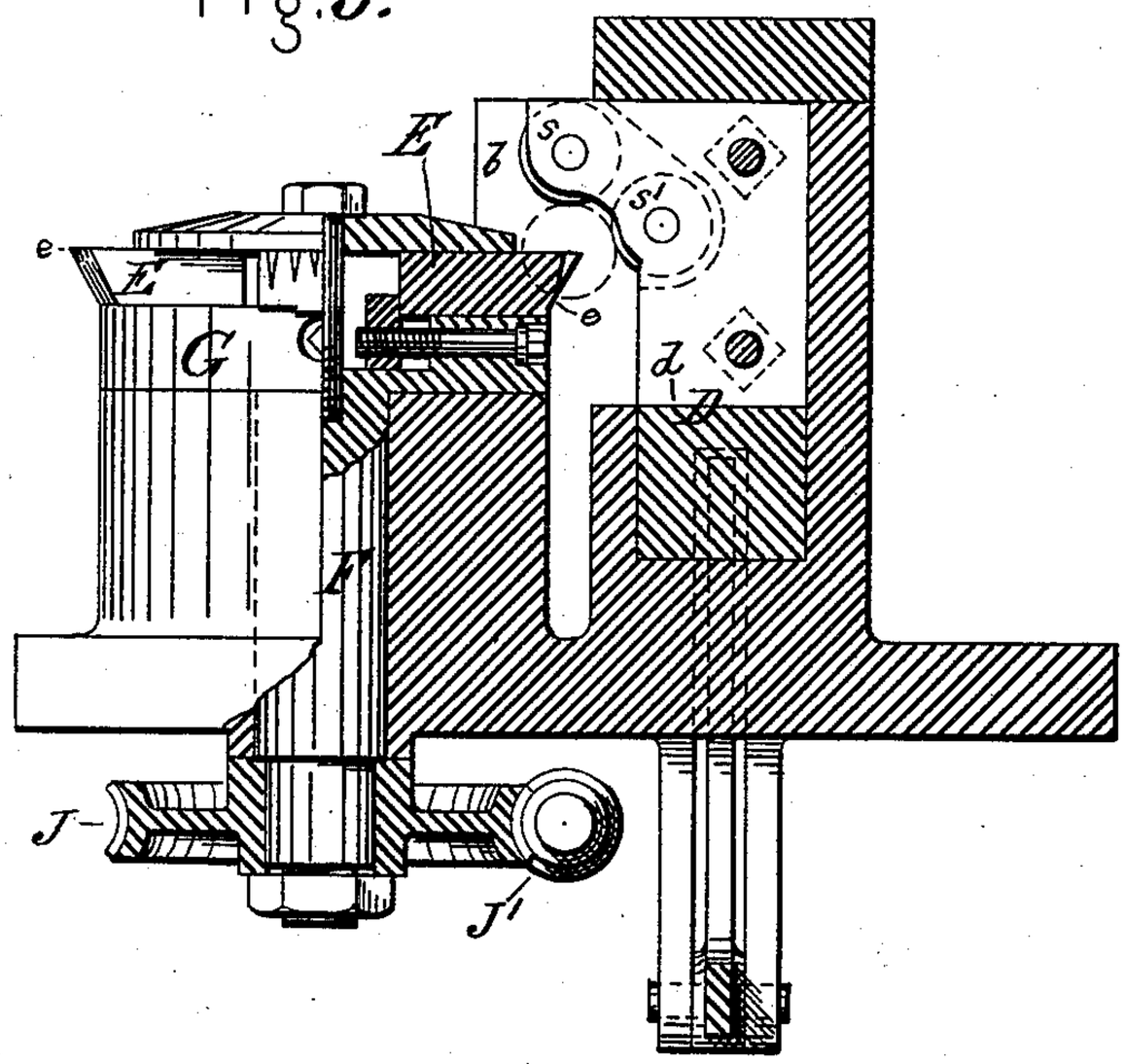

Fig. 4.

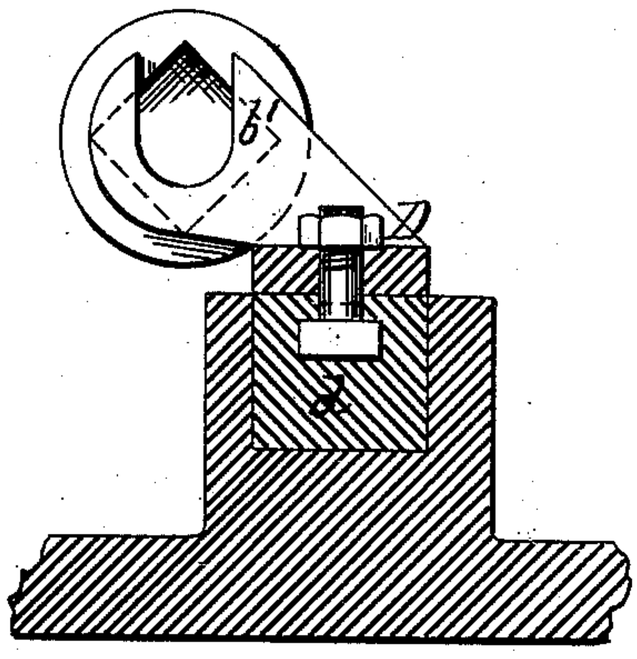

Fig. 5.

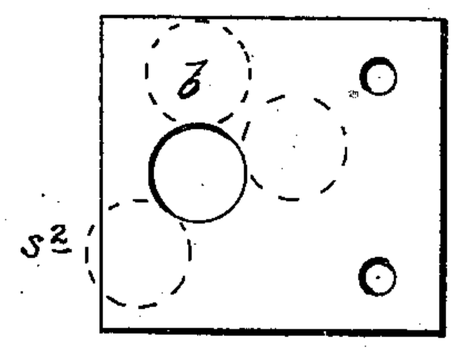

Fig. 6.

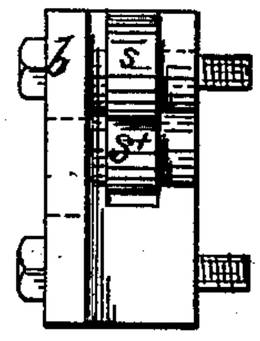

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Fig. 12

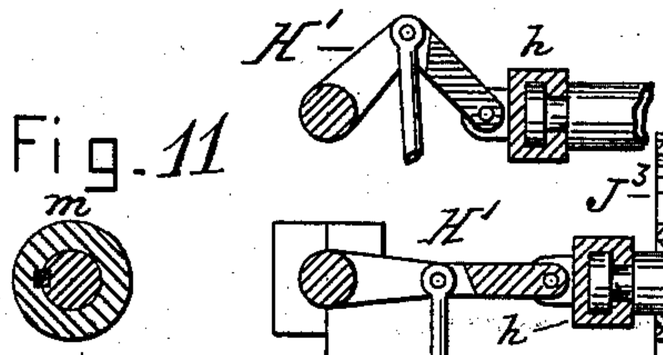

Fig. 11

Fig. 9.

Fig. 10.

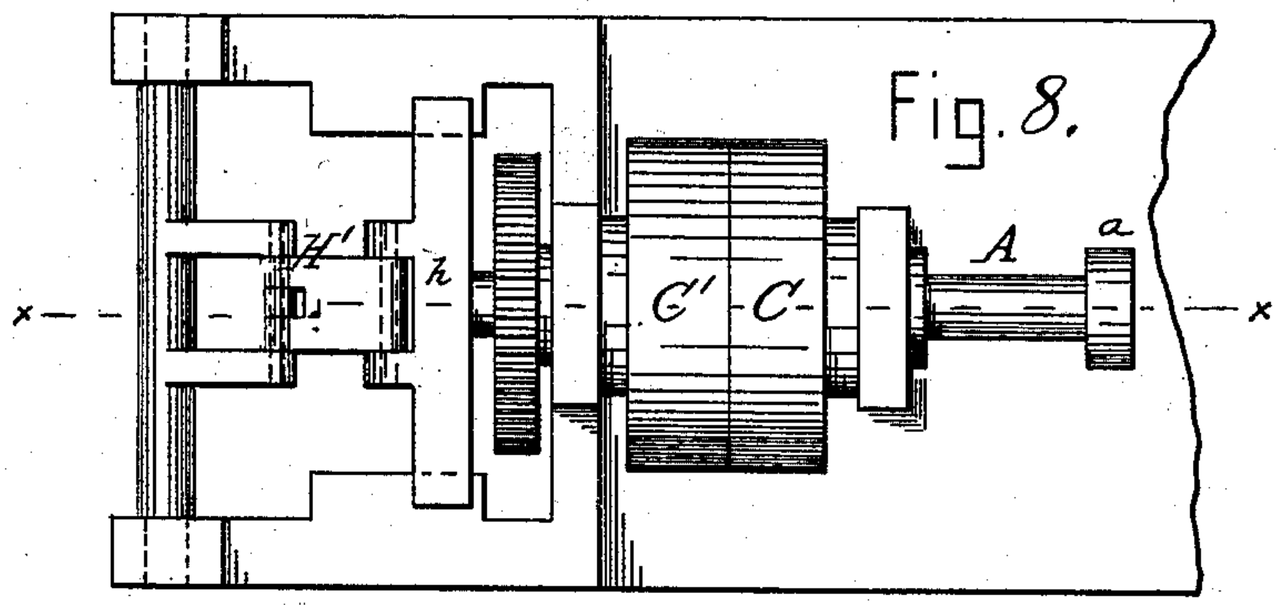

Fig. 8.

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SCREW THREADING MACHINE.

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Fig. 14

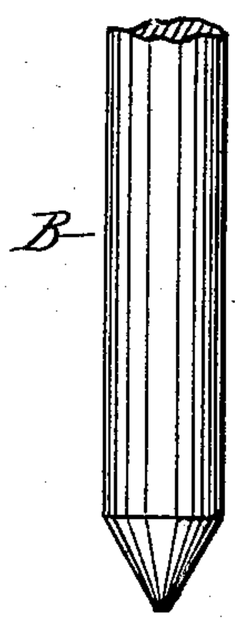
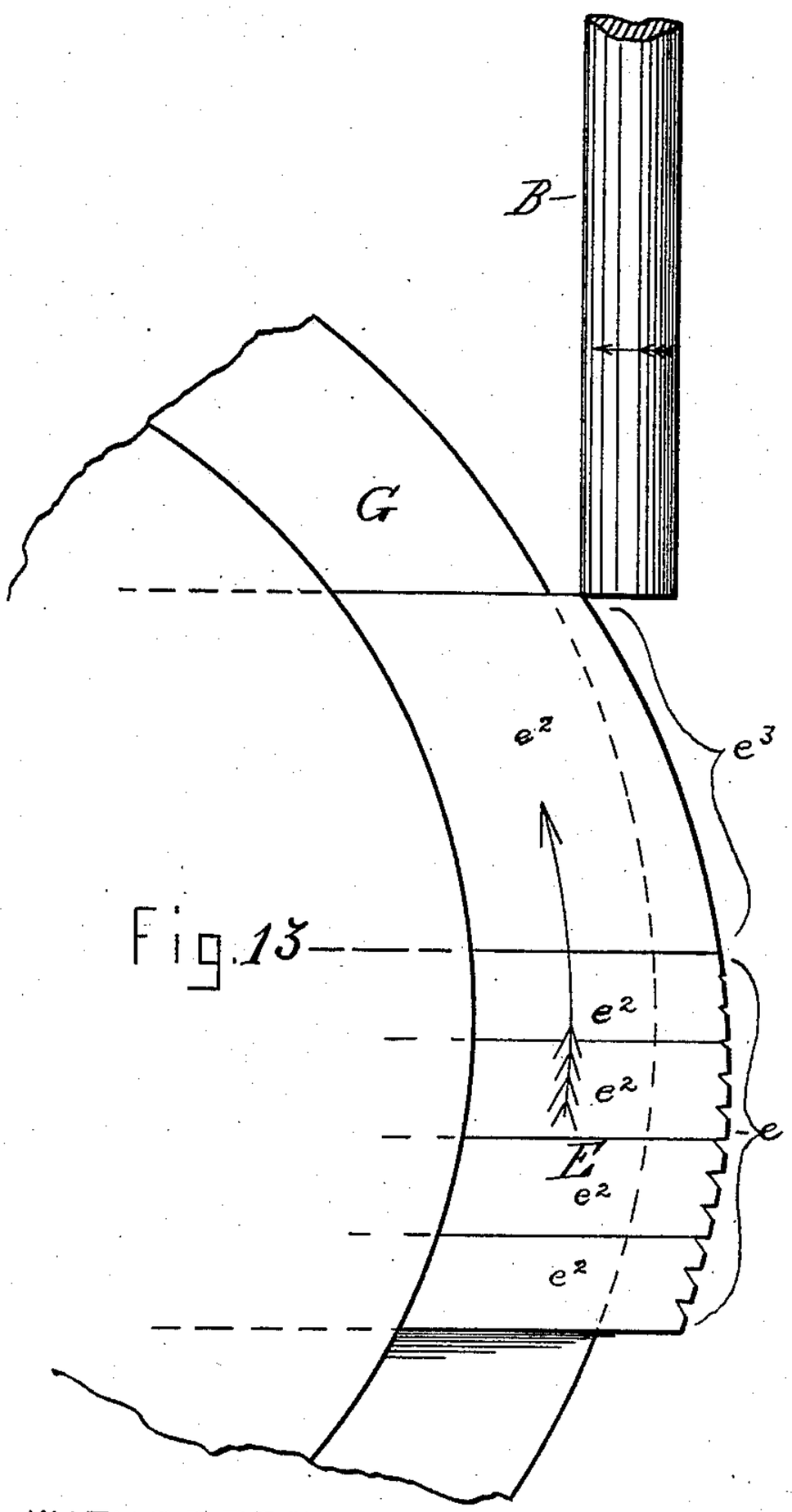


Fig. 15.

Fig. 13



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C. S. Fenwick

UNITED STATES PATENT OFFICE.

ORRIN CLARK BURDICT, OF BUFFALO, NEW YORK, ASSIGNOR TO PLUMB, BURDICT & BARNARD, OF SAME PLACE.

SCREW-THREADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 349,083, dated September 14, 1886.

Application filed June 15, 1886. Serial No. 205,191. (No model.)

To all whom it may concern:

Be it known that I, ORRIN CLARK BURDICT, of Buffalo, in the county of Erie and State of New York, have made an invention of certain new and useful Improvements in Threading-Machines for Cutting the Threads of Screws; and I do hereby declare that the following, in connection with the accompanying drawings, is a full, clear, and exact description and specification of the same.

The purpose of this invention is to cut the threaded points of what are known as "coach-screws" or "lag-screws;" but the invention is applicable to other purposes.

The invention consists of certain combinations of mechanical devices by means of which the point of a blank may have a conoidal screw-thread rapidly cut upon it, or may be trimmed to a conoidal form. These combinations are recited in the claims at the close of this specification. In order that they may be fully understood, I have represented in the accompanying drawings and will proceed to describe a machine embodying them in the best form which I have produced at the date of this application, it being understood that the construction of the machine may be varied as circumstances or the views of different constructers or users render expedient.

Figure 1 of the accompanying drawings represents a side view of the said machine. Fig. 2 represents a plan of the same. Fig. 3 represents an end view of the same, partly in section, at the line *x x* of Fig. 2. Fig. 4 represents a partial section of the machine at the line *y y* of Fig. 2. Fig. 5 represents a face view of the eye-bearing for the screw-blank. Fig. 6 represents an edge view of the same with friction-wheels added thereto. Fig. 7 represents a plan of portions of the cutting-tool and screw-blank. Fig. 8 represents a plan of a part of the machine modified, as hereinafter set forth. Fig. 9 represents a vertical section of the same at the line *x x* of Fig. 8. Fig. 10 represents an end view of the mandrel, and Fig. 11 a cross-section of the mandrel and sleeve at the line *y y* of Fig. 9. Fig. 12 represents a partial section of the toggle mechanism flexed. Figs. 13, 14, and 15 represent plans of the cutting-tool and of the screw-blanks in different conditions, as hereinafter set forth.

In the use of the machine represented in the said drawings the blank whose point is to be threaded is supported in the bearings of a blank-holder, in which it may be turned axially by means of a revolving mandrel while a tool or cutter is advanced in a circular direction against the point of the blank, so that as the blank is turned upon its axis its point is shaved off.

The mandrel A, by which the blank B is revolved, is supported in suitable bearings, and is fitted with a belt-pulley, C, to which the driving-belt is applied, a loose pulley, C′, also being provided for the belt when the machine is to be stopped. One end of the mandrel is fitted with a socket-chuck, *a*, whose socket corresponds with the head of the lag-screw blank or other article whose point is to be dressed up, so that when the head of the blank is engaged in the said chuck the blank is compelled to revolve with the mandrel. In order that blanks to be dressed may be readily connected with the chuck at the end of the mandrel, and may also be held against the pressure of the cutting-tool, a blank-holder, D, is provided. This blank-holder consists, preferably, of two bearings, *b b′*, connected by a base-plate, *d*. The stem of the blank is supported by the two bearings *b b′*, one of which, *b*, is of eye form, while the other, *b′*, is open to permit the blank to be readily applied to it and removed from it; but if the chuck at the end of the mandrel is a gripping-chuck the eye-blank bearing *b* alone, or some substitute for it, is necessary to hold the blank, although it is always expedient that both bearings should be used to facilitate the application of the head of the blank to the chuck of the mandrel.

The cutting-tool or cutter E, by means of which the point of the blank is dressed, is secured to a tool-rest, G, which is made fast to a shaft, F, that is fitted to turn in a bearing, so that when the said tool-rest is turned in the direction indicated by the arrow in Fig. 2 the cutting-tool is advanced in a circular direction against the point of the blank. The cutting-edge *e* of the cutter E is curved eccentric to

the shaft with which the tool-rest G turns, so that when the edge of the cutter is advanced against the point of the blank in a circular direction the eccentric cutting-edge is compelled to approach progressively the axis of the blank, and thus shave off the metal.

In order that the cutting-tool may be advanced automatically against the blank, the shaft of the turning tool-rest is fitted with a worm-wheel, J, whose teeth are engaged by a feed-screw, J′, and the shaft of the latter is connected with the mandrel A through the intervention of cog-wheels J^2 J^3, so that the cutting-tool is advanced against the point of the blank with a speed which bears a determined relationship to the revolutions of the mandrel.

When the points of lag-screws or coach-screws are to be threaded, the edge of the cutting-tool is notched, so as to form it into teeth which correspond with the form and pitch of the screw-thread to be cut upon the point of the blank, and the gearing J J′ J^2 J^3, which connects the circular tool-rest with the mandrel, is so proportioned as to advance or move the edge of the cutting-tool along the point of the blank in accordance with the pitch of the screw-thread. The extent of the edge of the cutting-tool is sufficient to dress up the point of the blank by a single movement of the cutting-tool along that point, the successive portions or teeth of the cutting-tool operating in succession to remove successive shavings from the blank.

In the machine as thus far described the turning tool-rest, with the cutting-tool, is moved continuously in a circular direction, and consequently when one cutting-tool has done its work upon a blank it is not in a position to operate again upon a fresh blank until the cutting-tool has been carried around in a circle by the circular tool-rest.

In order that there may be no lost time between the successive operations of the same cutting-tool, the turning tool-rest G is fitted with a number of cutting-tools, E, which are brought into operation successively, and each two cutting-tools are separated by a space, *c*, so that as the turning tool-rest is turned upon its axis time is afforded between the end of operation of one cutting-tool and the commencement of operation of the next succeeding cutting-tool for the removal from the machine of the blank which has been dressed up and the entrance into the machine of a fresh blank. With this arrangement of cutting-tools, therefore, the machine may be run continuously without loss of time.

In order that the blanks may be readily engaged with and disengaged from the mandrel, the blank-holder D is arranged to slide endwise of the mandrel, so that when the blank has been placed in the bearings of the blank-holder D the blank may be readily engaged with the end of the mandrel by moving the blank-holder toward the end thereof, and the dressed blank may be readily disengaged from the mandrel by moving the blank-holder in the reverse direction. In order to facilitate the movement of the blank-holder by the operator, it is connected with a disengaging-lever, H, by means of which the blank-holder may be moved to and fro; and to facilitate this movement by the operator the disengaging-lever is connected with a treadle, I, to which the operator may apply his foot for the purpose of moving the blank-holder in one direction, and a counter-weight, I′, is provided to move the blank-holder in the opposite direction whenever the treadle-lever is released by the foot. Instead of moving the blank toward and from the mandrel, the mandrel may be moved toward and from the position of the chuck. In the latter case the blank-holder is made fast to the frame of the machine, and the mandrel A is fitted to slide endwise, and it may be moved endwise at the requisite times by means of a toggle, as represented at Figs. 8, 9, 10, 11, and 12, the said toggle being thus a substitute for the disengaging-lever. With this modification of the machine it is expedient to fit the mandrel to slide endwise in a tubular shaft or sleeve, *m*, to which the belt-pulleys C C′ are applied, and to connect the mandrel A with the tubular shaft *m* by means of a spline and groove, as represented in section at Fig. 11, so as to compel the mandrel to revolve with the tubular shaft and its driving-pulley, while the mandrel can slide endwise through the tubular shaft. In this modification the mandrel may be moved endwise to and fro by means of a treadle and counter-weight connected with the toggle H′, and the toggle may be connected with the grooved end of the mandrel by means of a sliding cross-head, *h*.

As the wear upon the eye-bearing *b*, Figs. 1 to 6, of the blank-holder would necessarily be great if the stems of the blanks bore directly upon it, I prefer to fit it with at least two friction-wheels, *s s′*, Figs. 3 and 6, at the places where the greatest strain is experienced. To reduce the wear still further, a third friction-wheel may be employed, as represented in dotted lines at s^2, Fig. 5, and if deemed expedient the necessary bearing-surface of the eye-bearing may consist exclusively of friction-wheels. I prefer to construct each cutting-tool of a single piece of material; but if deemed expedient each cutting-tool may be made of sections, as represented at e^2 e^2, Fig. 13.

When threading the points of coach-screws or lag-screws, I prefer to apply to the machine blanks which have had their points made into conoidal form, as represented at Fig. 14, either by forging them or by a preliminary reduction from the cylindrical form of the rod from which the blank has been forged; but, if deemed expedient, the cylindrical point of a blank may be dressed to a conoidal form and may have the thread cut upon it by one operation in the machine, in which case the extent of the cutting-edge of the cutting-tool should be increased, as represented at Fig. 13, so that the extension e^3 may operate first up-

on the blank to shave it into conoidal form and then the toothed portion *e* of the cutting-tool may follow the extension and form the screw-thread.

If deemed expedient, the dressing of the cylindrical end of the blank to the conoidal form represented at Fig. 14 may be effected in one machine having an eccentric cutting-tool with an eccentric edge like that, e^3, of the cutting-tool in Fig. 13, and the conoidal point may be threaded in a second machine having an eccentric cutting-tool with an eccentric notched edge like that, *e*, of the cutting-tool in Fig. 13.

I claim as my invention—

1. The combination, substantially as before set forth, of the mandrel, the turning tool-rest, and the eccentric cutting-tool.

2. The combination, substantially as before set forth, of the mandrel, the blank-holder, the turning tool-rest, and the eccentric cutting-tool.

3. The combination, substantially as before set forth, of the mandrel, the blank-holder, the turning tool-rest, and the gearing whereby the turning tool-rest is turned automatically.

4. The combination, substantially as before set forth, of the mandrel, the blank-holder, the turning tool-rest, and the disengaging-lever.

5. The combination, substantially as before set forth, of the mandrel, the blank-holder, the turning tool-rest, the gearing whereby the tool-rest is turned automatically, the disengaging-lever, and the treadle.

In witness whereof I have hereto set my hand this 10th day of June, A. D. 1886.

ORRIN CLARK BURDICT.

Witnesses:
L. VAN OSTRAND,
HENRY V. NOONEN.