No. 619,139. Patented Feb. 7, 1899.

C. F. CHASE.

SCREW CUTTING APPARATUS.

(Application filed Feb. 16, 1898.)

(No Model.) 2 Sheets—Sheet 1.

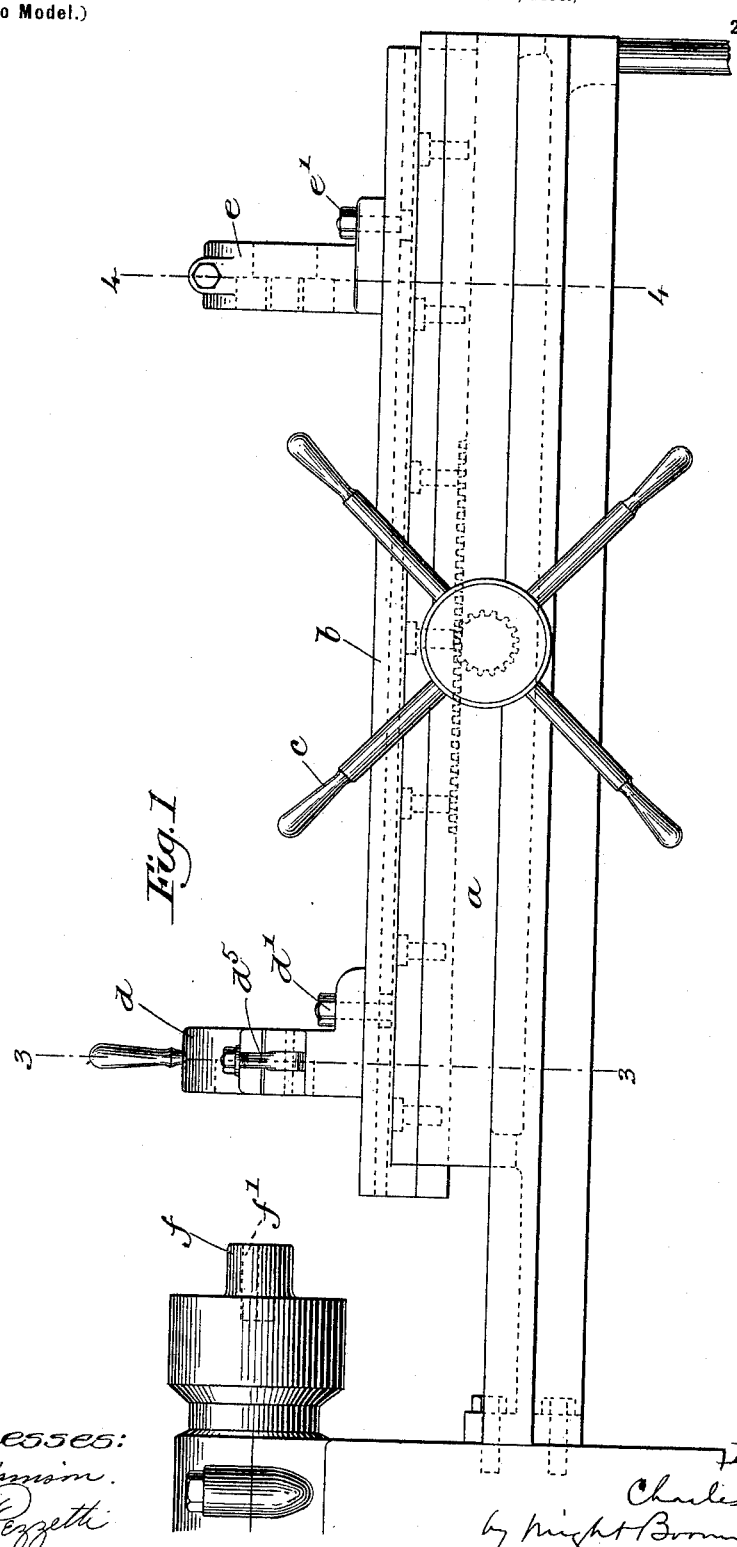

Fig. 1

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Fig. 2.

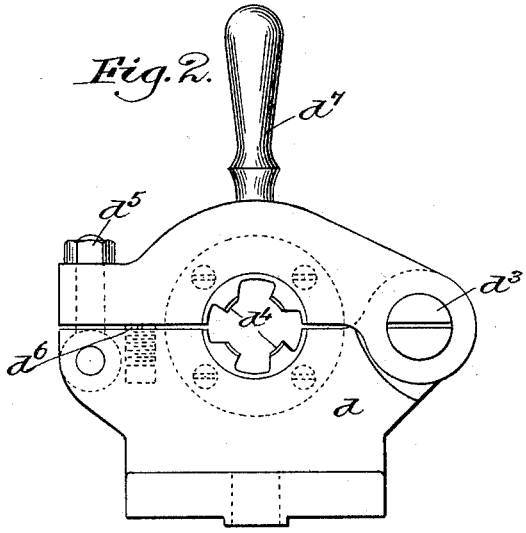


Fig. 3.

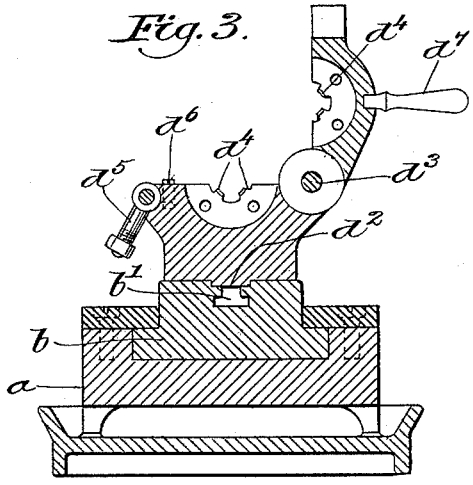


Fig. 4.

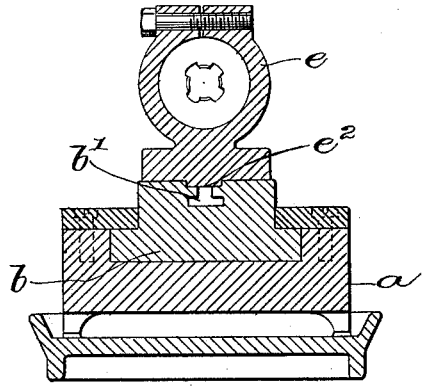
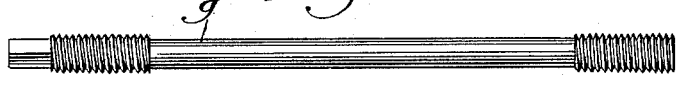


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES F. CHASE, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO THE JONES & LAMSON MACHINE COMPANY, OF SPRINGFIELD, VERMONT.

SCREW-CUTTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 619,139, dated February 7, 1899.

Application filed February 16, 1898. Serial No. 670,459. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. CHASE, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Screw-Cutting Apparatus, of which the following is a specification.

This invention relates to screw-cutting apparatus; and its general object is to provide means for cutting screw-threads simultaneously at different points on the length of a bolt or similar article.

The invention consists in the novel features of construction and arrangement, which I shall now proceed to describe and claim.

Of the accompanying drawings, forming a part of this application, Figure 1 represents in side elevation a bolt-machine provided with a screw-cutting apparatus constructed in accordance with my invention. Fig. 2 represents a front view, on a larger scale, of one of the screw-cutting dies shown in Fig. 1. Fig. 3 represents a section on the line 3 3 of Fig. 1. Fig. 4 represents a view similar to Fig. 3, showing a modified form of die, being a section on the line 4 4 of Fig. 1. Fig. 5 represents in side elevation a stay-bolt produced by my improved apparatus.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, *a* is the bed of the lathe or bolt-machine, and *b* the carriage or die-holder, which is constructed as a slide movable in suitable guides and arranged to be actuated by means of a rack and pinion controlled by a hand-wheel *c*. Upon the carriage *b* are mounted two screw-cutting dies *d* and *e*, having their axes in longitudinal alinement and provided with headed bolts *d'* *e'*, whose lower ends engage a T-groove *b'*, extending for the length of the carriage *b*, whereby the dies may be fixed in any desired longitudinal position on said carriage. For the purpose of holding the dies in their proper alinement each is formed with a tenon d^2 or e^2, fitting closely in a groove formed in the carriage above the T-groove.

I have illustrated in the drawings two different forms of die suitable for operating on work of the character hereinafter described, although it will be understood that dies of other appropriate type or construction could be utilized in carrying out the general purpose of the invention.

The die *d* (shown at the left in Fig. 1 and illustrated in detail in Figs. 2 and 3) is constructed in halves, which are hinged together at d^3, so as to be opened out, as shown in Fig. 3, for the purpose of removing and inserting the work. Each half carries two of the cutters d^4, and the two halves are clamped together by means of an eyebolt d^5. d^6 is a screw-stud for adjusting the size of the central opening within certain limits, and d^7 is a handle affixed to the upper half of the die for the purpose of opening and closing the die.

In Fig. 4 and at the right in Fig. 1 I have shown a non-opening die consisting of an outer body formed as a split collar and an inner body or cutter portion held in said collar.

In operating to produce boiler stay-bolts, which is the class of work for which the apparatus shown is particularly adapted, the blanks are brought to the machine, forged with enlarged ends and a square nib at one end, which affords means for driving the bolt. This squared end is placed in a square hole or socket *f'* in the chuck *f* of the lathe, while the die *d* is in the open position shown in Fig. 4, after which said die is closed and the carriage and dies are fed forward against the revolving bolt. The two dies operate simultaneously on the enlarged ends of the bolt, threading both ends at once and producing a finished bolt, such as that shown in Fig. 5.

It will be noted that the bolt *g* in Fig. 5 is unlike the ordinary stay-bolt used in connecting the shells of a steam-boiler in that it has screw-threaded end portions and a reduced middle portion. The common method is to form the bolt of uniform diameter and screw-thread it from end to end; but I prefer the construction shown as facilitating the threading operation and the placing of the bolts in the boiler.

In practice it is found to be exceedingly difficult to make and fit stay-bolts in boilers properly because of a permanent shrinkage or elongation which takes place in the taps used to thread the holes in the boiler-shells during the process of hardening which the taps un-

dergo after being threaded. Since by present-used methods it is rarely possible to thread a stay-bolt in such a manner as to correspond exactly to the lead of a tap after it has been thus changed from its correct lead, the result is that when the bolts are fixed in place to connect the two parts in the boiler (usually the inner and outer shells surrounding the fire-box) one bolt may be forcing the shells apart while the next adjoining bolt is drawing them together, thus producing detrimental strains.

In using the tandem-die arrangement above described the dies may be located in the proper relation to one another by placing the tap which is to be used to produce the boiler-threads into the dies by sliding them the correct distance apart, so that the tap will enter both. This locates the dies in the correct relative position, and the dies in turn will produce screw-threads on the stay-bolt which will correspond to the lead of the stay-bolt tap. If the thread of such a bolt is found to be longer or shorter than that of the tap, a slight additional adjustment of the die readily corrects it. The taps may be cut directly by the tandem dies and tempered, as usual, or may be produced in any other suitable or desired manner.

By employing an opening-die, such as the die *d*, a saving of time is effected in removing the work, since the finished bolt can be removed without running the carriage back for the whole length of the bolt. It is obvious that a side-opening die could also be used in place of the die *e*.

The apparatus shown in the drawings is particularly adapted for cutting radial stays varying in length from twelve to thirty inches.

A modification of the method of operation above described would be to cut both threads on the bolt with the front die *d* and in cutting the second thread use the rear die *e* as a nut to control the lead of said thread. The same effect would be produced by replacing the rear die with a plain nut, which would preferably have provisions for longitudinal adjustment in the same manner as the die. It is obvious that the threads on the stay-bolt could be located in this case with the same accuracy as when the two dies are employed as cutters simultaneously.

It will be understood that my improved apparatus is not limited in its application to the production of stay-bolts, but is suitable for other work of a like character, and it will be further understood that I do not confine myself to the exact details of construction above set forth, since the same may be variously modified without departing from the spirit of my invention.

I claim—

1. As a means for threading a piece of work simultaneously in the same direction at separate portions of its length, a screw-cutting apparatus comprising a plurality of screw-cutting dies mounted with their axes in longitudinal alinement, and means for adjustably maintaining said dies at fixed distances apart.

2. A screw-cutting apparatus comprising a support, and a plurality of screw-cutting dies affixed thereto so as to be capable of relative longitudinal adjustment and having their axes in longitudinal alinement.

3. A screw-cutting apparatus comprising a support, two screw-cutting dies mounted thereon, means for maintaining the axes of said dies in longitudinal alinement, and means for adjustably securing one of said dies to the support at fixed distances from the other.

4. A screw-cutting apparatus comprising a support formed with a longitudinal groove, a screw-cutting die mounted thereon, and a second screw-cutting die mounted thereon and formed with a tenon fitted to engage the groove in the support so as to maintain its axis in longitudinal alinement with the axis of the first die, and means for adjustably securing the second die at fixed distances from the first die.

5. A screw-cutting apparatus comprising a screw-cutting die constructed to be opened and closed for the purpose set forth, a second screw-cutting die mounted with its axis in longitudinal alinement with the axis of the first die, and means for adjustably maintaining said dies at fixed distances apart.

6. A screw-cutting apparatus comprising a screw-cutting die, a nut of the same internal diameter as the die and mounted with its axis in longitudinal alinement with the axis of the die, and means for adjustably maintaining said die and nut at fixed distances apart, the arrangement being such that the nut is adapted to engage a thread already cut on the work by the die, and lead the work during the cutting of a second thread by the die.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES F. CHASE.

Witnesses:
GEORGE H. PIPER,
EDWARD H. SLACK.