3 Sheets—Sheet 1.

J. J. GRANT.

GAGES FOR THE MANUFACTURE OF THE CHASERS OF SCREW-CUTTING DIES.

No. 192,824. Patented July 10, 1877.

FIG. 1.

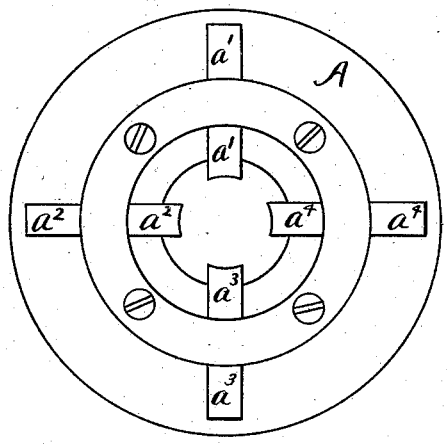
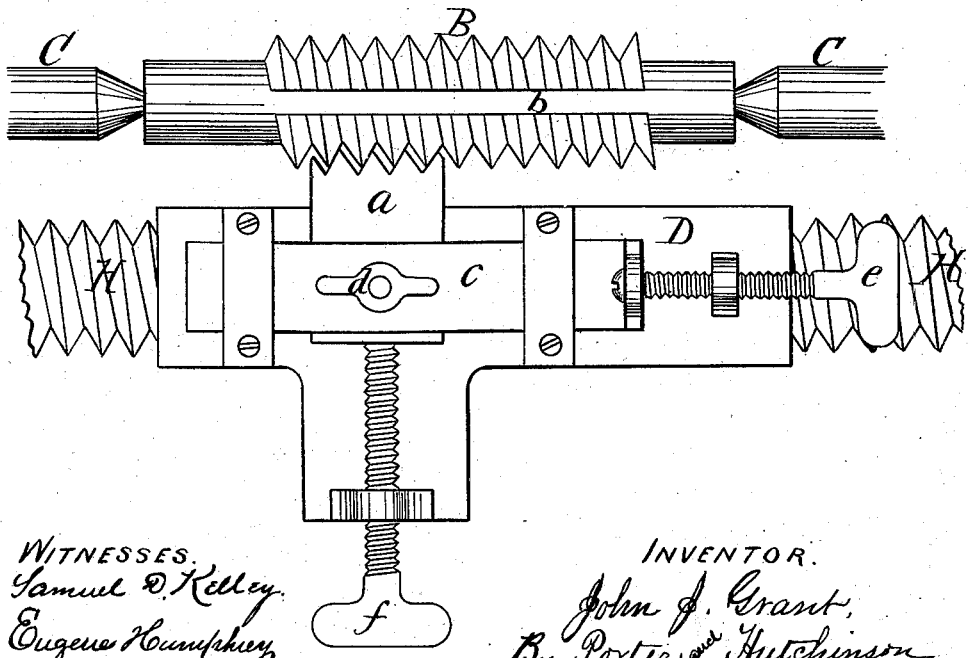


FIG. 2.



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3 Sheets—Sheet 2.

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FIG. 3.

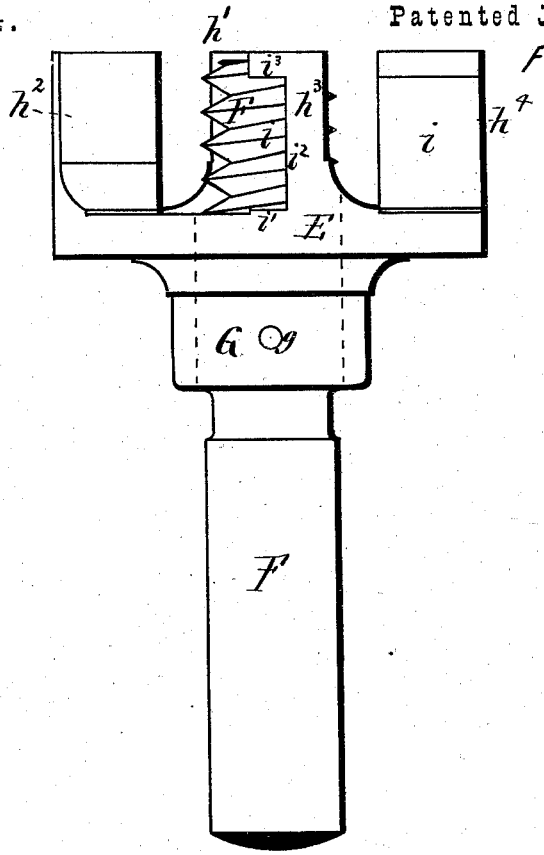

FIG. 4.

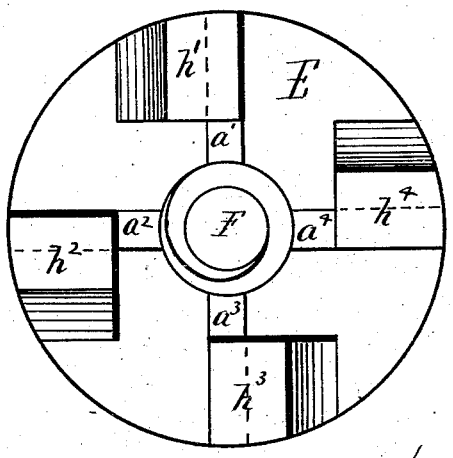

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Fig. 8.

Fig 5.

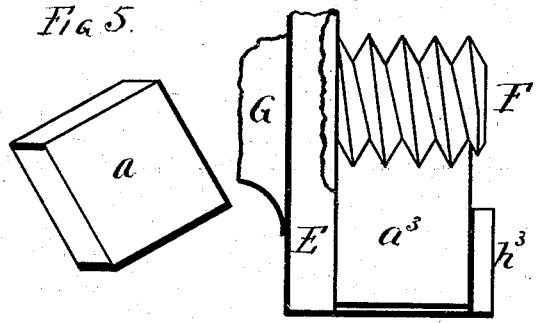

Fig 6

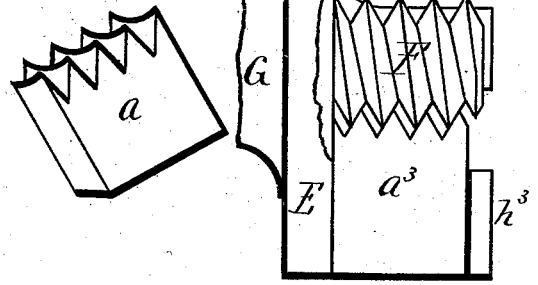

Fig 7.

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UNITED STATES PATENT OFFICE.

JOHN J. GRANT, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN GAGES FOR THE MANUFACTURE OF THE CHASERS OF SCREW-CUTTING DIES.

Specification forming part of Letters Patent No. **192,824**, dated July 10, 1877; application filed February 28, 1877.

To all whom it may concern:

Be it known that I, JOHN J. GRANT, of Hartford, in the State of Connecticut, have invented a new and Improved Test-Gage for Duplicating the Chasers of Screw-Cutting Dies, which gage is fully described and set forth in the following specification and the accompanying drawings, which show the gage and die.

This invention relates to that class of screw-cutting dies which are formed with a stock or body wherein are inserted radially around a common center a series of cutters or chasers, in a positive plane, either adjustable or not toward such center, and at fixed and positive points in a circumferential line, the converging ends of which cutters respectively represent arcs of a female screw of a radius equal to the distance from such threaded ends of the chasers to their said common center, the threads on the several chasers having the same relation to a common and unvarying plane and to each other as if a continuous thread were first cut in such die, and then such portions of the thread were cut away as would leave the parts represented by the chasers. And the result sought to be accomplished by the invention is the testing and adjusting to such test of the said chasers, so that each and every such chaser, when so tested and adjusted, shall, according to its designated position, as shown by a figure or other indicator, when secured in such stock or holder, perfectly coincide in the path or plane described by its threads with that of the threads of each and every of the several chasers therein secured; and it consists in the test-gage by which such chasers are so tested.

In the said drawings, Figure 1 is a top or plan view of the screw-cutting die. Fig. 2 is a top or plan view of a device for threading the ends of the chasers and for adjusting the same. Fig. 3 is a side elevation of the test-gage. Fig. 4 is a top or plan view of the same. Fig. 5 is a perspective view of one of the chaser-blanks. Fig. 6 is a perspective view of a threaded chaser. Fig. 7 is an elevation of the test-gage with a portion broken away, and showing one of the chasers as being tested and not coinciding with the gage. Fig. 8 is a similar elevation, but showing the chaser as adjusted and coinciding with the test-gage.

Of the devices shown in these several figures, the gage shown in Figs. 3, 4, 7, 8 is alone claimed by me, the other devices being well known, and are only introduced in the drawings for the more ready illustration and description of my invention.

In these drawings, A is the stock or body of the cutting-die, and *a a a a* are the chasers or cutters, which may be numbered, respectively, 1, 2, 3, 4, with corresponding numbers upon the body, as is also shown.

As this die already constitutes the subject-matter of Letters Patent, and is sufficiently shown in said Fig. 1, it need only be remarked that in practicing my invention any desired number of chasers *a* may be employed, and that, for convenience of construction, the same are arranged equidistant around the circumference of the stock A, and that it may be so constructed that the chasers may be adjusted radially relatively to a common center.

In Fig. 2, B is a fluted or toothed spiral cutter, revolving on centers C C. The teeth of this cutter consist of threads of the desired pitch of the chasers *a*, traversed by grooves *b*, as shown, whereby the rotary action of the cutter and the lateral movement of the chaser *a*, by means of the actuating-screw H, having the same pitch as cutter B, serve to impart to the latter a thread coincident with that of cutter B. The chaser *a* rests upon bed D, and is secured in position by clamp *c* and its set-screw *d*, and by the action of adjusting-screw *e*, acting upon clamp *c*, the chaser may be adjusted relatively to the teeth of the cutter in the direction of its axial line, so that if threaded it shall coincide therewith or may not, as is shown in the drawings. By means of screw *f*, chaser *a* may be adjusted in a line transversely to the axis of cutter B, as desired.

It will, of course, be understood that the bed D has an end movement upon fixed ways, that it keeps pace with the movement or pitch of the thread on the cutter B, and that, by means of the adjusting-screws *e f*, chaser *a* may be so adjusted relatively to cutter B that, however the threads in the chaser might at first be cut relatively to its edge lines, the

same could be so recut and varied as that they should occupy any desired relative position to such edge lines.

Instead of the familiar device here shown for cutting and adjusting the thread of the chasers, any other that will accomplish the same result may be employed.

In Figs 3, 4, 7, 8, the test-gage is represented as formed with a circular plate or bed, E, and a threaded shaft, F, which passes centrally through plate E, and is secured in position by a pin, *g*, which passes through the annular boss G, formed upon plate E, and the shaft. The lower portion of this shaft serves as a handle by which to manipulate the gage, while the upper portion is formed with a thread to which it is desired that the thread of chasers *a* shall correspond. Upon plate E are formed four members, h^1 h^2 h^3 h^4, which are provided with a recess or slot, *i*, bounded by lines i^1, i^2, and i^3, and corresponding to the width of the chasers *a*, and so arranged as that when the chasers are in position therein, as shown in Figs. 4, 7, and 8, a line passing through the center of the edge of the chasers would, if prolonged through shaft F, have the same relation to the axis thereof as a line so passing through the chasers when being cut, as shown in Fig. 2, would have to the axis of cutter B, which relative position would be determined by the amount of "freeing" or "clearance," so termed, which it was desired to impart to the cutting-edge of the chasers. The relative positions of the members *h* as regards the subdivisions or degrees of a circle are so arranged as to exactly coincide with the same relative positions of chasers *a* in die A—that is, if the chasers are arranged in die A at ninety degrees from each other, then the members *h* are so arranged that when the chasers are seated therein they will be at exactly ninety degrees from each other, while, if there are but three chasers in the die, and they are arranged at one hundred and twenty degrees from each other around a circle, then the members *h* are so arranged upon plate E, and the chasers are respectively and correspondingly numbered, as are also the seats in die A and gage, as shown, so that each chaser, when interchanged from the die to the gage, or the reverse, is placed in the seat bearing the number corresponding to that on the chaser.

My method of testing and adjusting the chasers is as follows: The blanks, as shown in Fig. 5, having been cut, as shown in Fig. 6, with a thread of the desired pitch, and as nearly as is practicable with reference to their edges, in order that the threads of the several chasers shall coincide with the path or plane of their pitch, when thus cut they are severally inserted in their numbered positions in the gage, and if found not to coincide with screw F, as shown in Fig. 7, they are proved not to be susceptible of duplication into any such die with adjusted chasers; but by the means shown in Fig. 2, or any equivalent device, the threads are adjusted relatively to the edge line of the chaser, and to such degree that, when inserted in its designated seat in the gage, its threads will coincide with screw F, as shown in Fig. 8, when it is demonstrated to be susceptible of use in die A with any other chasers of the proper numbers and similarly adjusted to their designated positions.

It will thus be seen that in case a chaser should be broken in use, tempering, or otherwise, it can be at once duplicated, and the others of the set thereby saved, instead of the necessity heretofore existing of making an entire new set of chasers when one was so destroyed, it having been heretofore deemed impossible so to cut one of the chasers as that when inserted in the die its thread should traverse the spiral path of the others when applied to practical use, and hence it has been necessary to first fit the chasers into the die, and then cut the thread upon the entire set while so in position.

The test-gage, with its screw F, is readily duplicated to any extent by means of a test-chaser, whereby the gage and screw F are adjusted relatively to each other when they are secured together by pin *g*, as described. And by means of this system of duplication, rendered feasible by my process, the several parts of the apparatus may be made in quantities without limit, with such precision that, when "assembled" in accordance with the indicating numbers, the certainty of adaptation is the same as if each set, in its several parts, had been specially adapted to itself in the usual tedious and expensive manner, instead of by this more rapid system.

I claim as my invention—

The test-gage constructed with the threaded core or center F, and the members of the sole-plate, with their seats *i* arranged around such center, substantially as and for the purposes specified.

JOHN J. GRANT.

Witnesses:
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WILMOT HORTON.