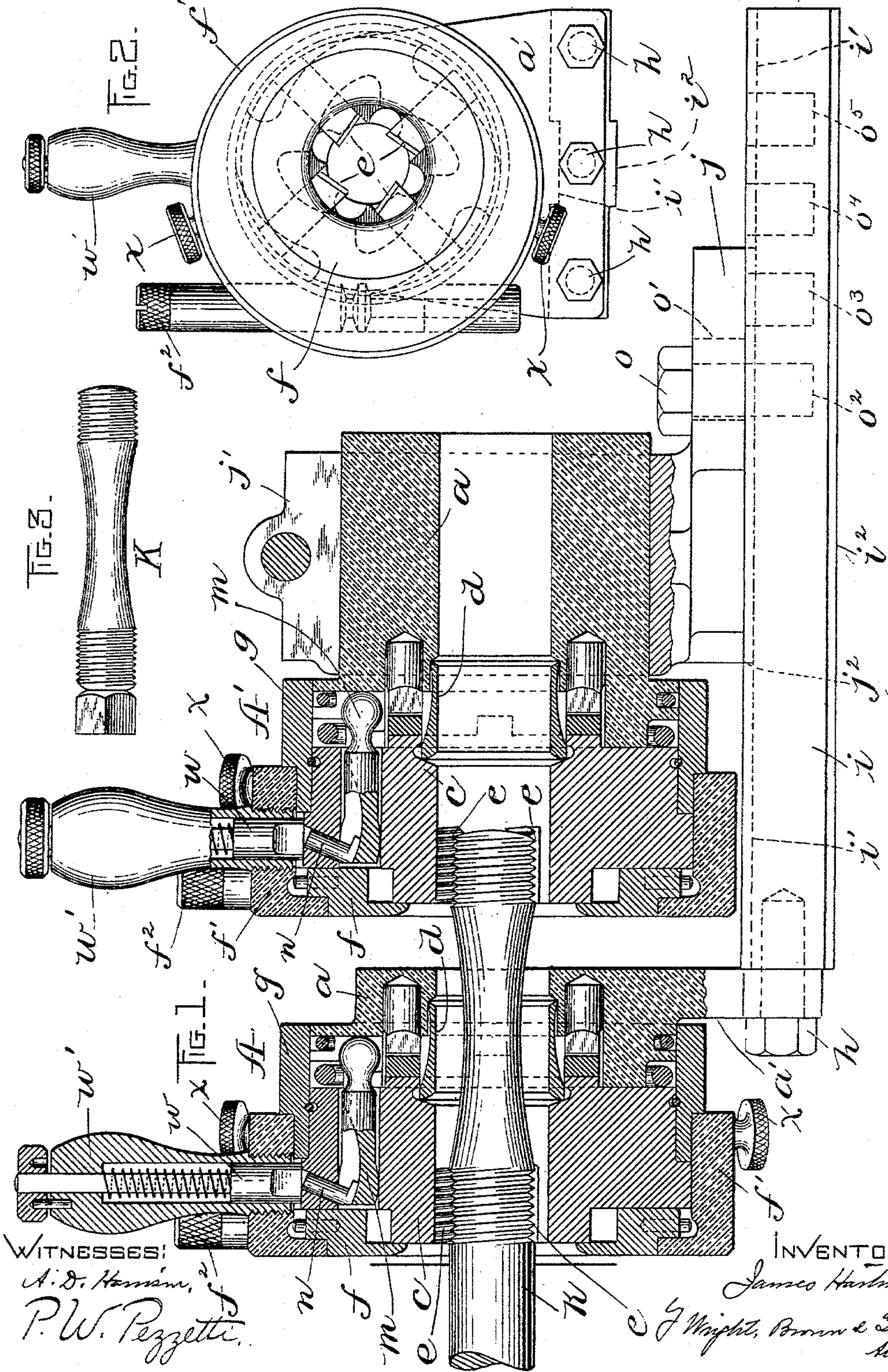


(No Model.)

J. HARTNESS.
SCREW CUTTING ATTACHMENT.

No. 596,750.

Patented Jan. 4, 1898.



WITNESSES:

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JAMES HARTNESS, OF SPRINGFIELD, VERMONT.

SCREW-CUTTING ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 596,750, dated January 4, 1898.

Application filed May 18, 1897. Serial No. 637,045. (No model.)

To all whom it may concern:

Be it known that I, JAMES HARTNESS, of Springfield, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Screw-Cutting Attachments, of which the following is a specification.

This invention relates to screw-cutting attachments for turret-lathes and other machines, and it relates more particularly to a method of mounting screw-cutting dies in tandem, so as to cut simultaneously two or more threads at different points in the length of a rod or bar.

In certain classes of screw-cutting work, such as in the manufacture of stay-bolts for steam-boilers, where these bolts are threaded at both ends to engage parts such as the outer and inner shells surrounding the fire-box, it is essential to the best results that a certain fixed relation should exist between the shell-engaging threads on each bolt and also that a corresponding fixed relation should exist between the boiler-threads which the bolts engage. With present methods it frequently happens that these relations are variable, and in consequence one stay-bolt in a boiler may be forcing the shells apart while the next adjoining bolt is drawing them together. Detrimental strains are thus produced, which may be avoided by the improved method of cutting threads which is furnished by my present invention.

The object of my invention may be said to be the production of devices for simultaneously screw-threading a rod or bar at two or more places in its length and for obtaining a determinate relation between the threads at the different places.

The invention consists in the novel features of construction and relative arrangement of parts, which I shall now proceed to describe and claim, reference being had to the accompanying drawings, in which—

Figure 1 represents in vertical longitudinal section and side elevation two screw-cutting dies arranged in tandem according to my invention, the work being shown in position. Fig. 2 represents a front elevation of the same. Fig. 3 represents a side elevation of

the work, which in this case is a boiler stay-bolt.

The same letters of reference indicate the same parts in all the figures.

For the sake of illustration merely I have shown two dies similar to the screw-cutting die described in Letters Patent No. 565,746, granted to me August 11, 1896, although my present invention is not limited to the use of dies of this pattern. A brief description of these dies will therefore suffice.

The letter *a* designates the shank or rear member of the die-body in each of the dies *A A'*, and *c* designates the forward member, which is movable slightly in a direction longitudinal with the shank *a*, but is rigidly engaged laterally and concentrically therewith.

In diverging slots in the face of the member *c* are located the cutters or chasers *e*, which are engaged by a four-part cam *f* and are adapted to be moved thereby outwardly or inwardly to open or close the die. The cam is embraced by a sleeve or cam-holder *f'*, which is fitted to rotate on the member *c* of the die-body, being adjustably connected with the cam by means of a screw *f*². The said cam-holder and cam may be partially rotated to open and close the die by means of a handle *w'* on the cam-holder, and the two are adapted to be held in rigid engagement with the member *c* by a spring-pressed bolt *w*, located in the handle *w'* and fitted to enter a shallow recess on the periphery of the said member *c*.

To automatically open the die, devices are provided as follows: A ring or collar *g* is connected with the cam-holder by means of knurl-headed screws *x x* and extends back over the shank *a*, a suitable spring being introduced between the collar and said shank whose tension throws the cam to a die-opening position when the bolt *w* becomes disengaged from the member *c*. This disengagement is effected when the member *c* moves outward relatively to the shank *a* by means of a sliding block *m*, which occupies an aperture in the member *c* and is provided with a head occupying a slot in the shank *a* and engaging said shank, so as to remain therewith when the member *c* moves outwardly. When said movement

occurs relatively to the shank *a*, the bolt *w* is raised and disengaged by means of a tappet-piece or releasing-pin *n*, whose lower end occupies a groove in the block, said groove having a curved or inclined base which acts to thrust the tappet-rod upwardly against the bolt. This automatic die-opening action takes place when the forward movement of the shank *a* has ceased, and the cutters and the member *c* continue to be moved forward by the continued rotation of the work.

The joint occurring where the members *a* and *c* abut is closed to exclude dirt and chips by a flat resilient band *d*, sprung into a recess in the wall of the central opening of the chuck or die-body.

In carrying out my invention, as hereinbefore stated, I contemplate the employment of two or more screw-cutting dies, such as A and A', mounted tandem or one behind the other, as shown in Fig. 1, for the purpose of acting simultaneously on two different portions of a rod or bar, such as *k*, and I will now proceed to describe a method of mounting the dies.

The shank *a* of the forward die A is formed with a downwardly-extending attaching-plate *a'* and is provided with attaching-bolts *h* *h*, by means of which it is secured at the forward end of a base-plate or support *i*. The shank *a* of the rear die A' is extended rearwardly and held in a split collar *j'*, forming part of a holder *j*, which is adjustably secured to the base-plate *i* by means of attaching-bolts *o*, the said bolts occupying slots *o'* in the holder and screwing into threaded sockets *o*² in the base-plate.

The die A' is held in longitudinal alinement with the forward die A by means of a tenon *j*², formed on the under side of the holder *j* and fitting in an elongated groove *i'* on the upper surface of the base-plate *i*. The said base-plate is formed with a similar tenon *i*², which is adapted to engage a groove on the top of a lathe-turret or equivalent support on another machine, to which the base-plate is affixed, and by said tenon the dies are held in longitudinal alinement with the work.

The slot *o'* (indicated by dotted lines in Fig. 1) is made longer than the width of the shank of the bolt *o*, so as to allow a small amount of longitudinal adjustment of the die A' with respect to the die A, and a more liberal adjustment corresponding to the different lengths of stay-bolts required is provided for by a series of threaded sockets *o*³ *o*⁴ *o*⁵ similar to the socket *o*² and placed at suitable distance apart, the bolt *o* being shifted to such a socket as will give the desired distance between the cutters *e* of the two dies A and A'.

It is obvious that the construction might be reversed by having the rear die A' permanently fixed and the forward die A adjustably mounted.

In Fig. 1 a cylindrical bar *k* is shown as being operated upon simultaneously by the dies to form screw-threads at the ends of the stay-

bolt, and in Fig. 3 the finished stay-bolt K is shown. It will be noticed that the bolt is reduced to form a waist between the two threaded portions. 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 position in the boilers.

One of the obstacles to exactness in making and fitting stay-bolts in boilers finds its cause in a permanent shrinkage or elongation which takes place during the process of hardening the taps which are used to produce a screw-thread in the holes in the boiler-shells. It is practically impossible by the present used methods to thread a stay-bolt in such a manner as to correspond exactly to the lead of a tap after it has thus changed from its correct lead. By the use of the tandem-die holder the dies may be located relative to each other by placing the tap which is used to produce the thread in the boilers into the dies by sliding the movable die the correct distance from the fixed die, 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 produced in any desired manner or may be cut directly by the tandem dies and tempered as usual.

My improved screw-cutting attachment is not of course limited to the production of stay-bolts, but will be found useful wherever it is desired to produce work of this character.

The tandem dies are obviously quicker of operation than a single die. The device is simple and the results obtained are accurate.

Any of the above-described details of construction may be altered or modified to an extent consistent with the scope 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 device comprising two or more screw-cutting dies mounted with their axes in longitudinal alinement, and adjustable means for maintaining said dies at a fixed distance apart.

2. A screw-cutting device comprising a suitable base, and two or more screw-cutting dies rigidly mounted thereon with their axes in longitudinal alinement, the said dies being capable of relative longitudinal adjustment.

3. A screw-cutting attachment comprising a suitable base, and two or more screw-cutting dies rigidly mounted thereon, with their axes in longitudinal alinement, one of said dies being fixed, and the other being adjustable relatively to the fixed die.

4. A screw-cutting device comprising a sup-

port or base-plate, a screw-cutting die fixedly mounted thereon, a holder having a tenon fitted to engage a longitudinal groove in the base-plate, means for securing said holder to the base-plate in successive positions relatively to the fixed die, and a screw-cutting die mounted in said holder, with its central axis in longitudinal alinement with the central axis of the fixed die.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 13th day of May, A. D. 1897.

JAMES HARTNESS.

Witnesses:

D. S. BROWNELL,
J. W. BENNETT.