2 Sheets--Sheet 1.

D. McGUIRE.

Improvement in Machines for Cutting Screws on Bolts.

No. 129,847. Patented July 23, 1872.

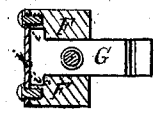

FIG- II-

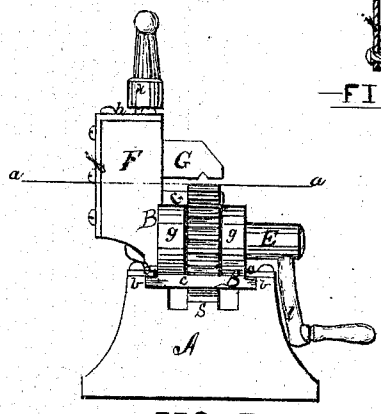

FIG.- I.-

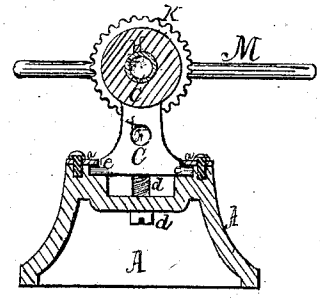

FIG- III.-

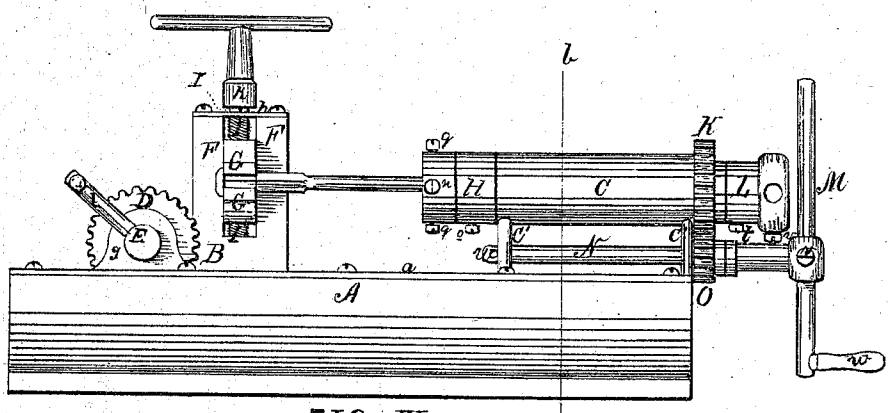

FIG. IV.

WITNESSES:—

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A. M. Smith

—INVENTOR.—

David McGuire

by his Atty P. Hannay

2 Sheets--Sheet 2.

D. McGUIRE.

Improvement in Machines for Cutting Screws on Bolts.

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FIG. V.

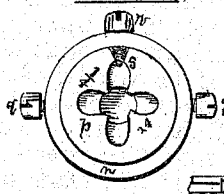


FIG. VI.

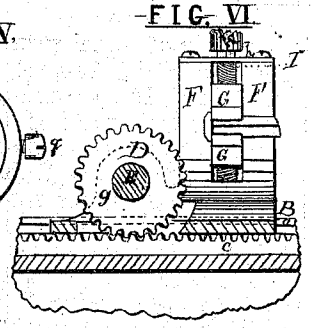


FIG. VII.

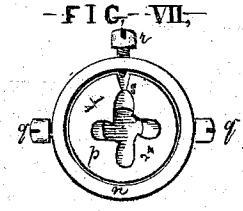


FIG. VIII.

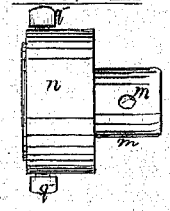


FIG. IX.

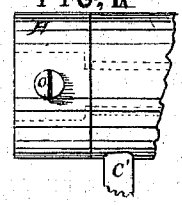


FIG. X.

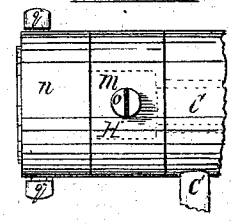
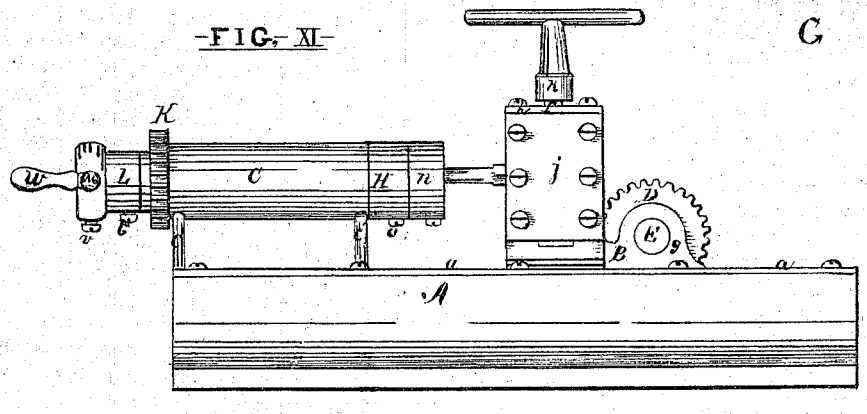


FIG. XI.



C

WITNESSES:—

D. G. Stuart

A. M. Smith

— INVENTOR:—

David McGuire

by his Atty P. Hannay

UNITED STATES PATENT OFFICE.

DAVID McGUIRE, OF NORTHAMPTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR CUTTING SCREWS ON BOLTS.

Specification forming part of Letters Patent No. **129,847**, dated July 23, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, DAVID McGUIRE, of Northampton, in the county of Hampshire and State of Massachusetts, have invented certain Improvements in Machines for Cuttin Screw-Threads on Bolts, Gas-Pipes, &c., of which the following is a specification, reference being had to the accompanying drawing, in which—

Figure 1 represents an end view of a machine having my improvements applied thereto, and Fig. 2 a horizontal section through the line *a a* of Fig. 1. Fig. 3 represents a similar view through the line *b b* of Fig. 4. Fig. 4 represents a side elevation of the improved machine; and Fig. 5, an end view of the adjustable die or cutter, showing it expanded to its full capacity, while Fig. 7 represents it as contracted to deepen the cut of the thread; Fig. 6, a side elevation of the clamping device detached, along with a portion of the bed-plate, to illustrate the mechanism for moving it back and forth on the screw-cutter. Fig. 8 represents the movable die-stock or screw-box detached from its mandrel; and Fig. 9, a view of the end of the mandrel to which the die-stock is secured, with a portion of the mandrel-holder broken off; and Fig. 10, a similar view of the same parts with the die-stock secured in place. Fig. 11 represents an elevation of the side of the machine opposite to that shown in Fig. 4.

My invention has for its object the production of a cheap, strong, durable, and effective hand-machine for cutting screw-threads on the end of blank bolts provided with heads at their end, as well as on those that are headless, and on various other kinds of work, such as gas and iron water pipes, &c.

To enable others skilled in the art to make, construct, and use my invention, I will now proceed to describe its parts in detail.

The operative parts of the machine are mounted on a strong cast-iron frame, A, which, if desired, may be provided with lugs to secure it to the work-bench; the upper side is formed as shown in Fig. 1, so as to provide guide-ways for the carriage B within which to slide, for which purpose lips *a* are made to project over the upper edges *b* of the bed-plate *c* of the carriage. The lips *a* are formed by a strip of metal securely bolted to the upper side of the frame A, there being one on each side. In the same groove or guide-way, but at the other end of the frame A, is rigidly secured, by means of a screw-bolt, *d*, the bed-plate *e* of the frame C that supports the mandrel. On the upper side of the frame A, between the guide-ways and in a plane slightly below them, is formed on the frame, or otherwise secured to it, a rack-bar, *f*, into the teeth of which the pinion D meshes, and through which motion is imparted to the carriage B, the pinion D for this purpose being mounted on a shaft, E, turning in suitable bearings mounted in standards, *g*, erected on the upper side of the bed-plate *c* of the carriage. Immediately in advance of the standards *g*, and cast on the same bed-plate *c*, or otherwise secured to it in any suitable manner, is arranged a strong frame, consisting of two standards, F, connected together at their upper end by a top plate, *h*, which is firmly bolted to them. The frame or standards F are made to project backward over the top side of the frame A, thereby bringing their front side in a line, or nearly so, with the inner edge of the lip *a*. In the back part of each standard F, adjoining the space included between them, is formed a recess, *i*, which, with the back plate *j* securely bolted to their rear sides, forms a guide-way, within which the flanges *i*, formed on the rear sides of the jaws G, slide up and down, as they are made to move toward or from each other, by means of the right-and-left-hand screw I, the jaws for this purpose being further guided between the inner sides of the standards F. By this arrangement (seen in Fig. 2) the jaws G of the clamp are made to preserve their parallelism with each other, thereby rendering them more efficient, and at the same time relieving their adjusting-screw I from strain. The lower end of the adjusting-screw (and which, as before stated, is a right-and-left-hand one, so that each shall move through equal increments of space from a given center in order to release or clamp a bolt arranged centrally with the dies) fits and rests into a bearing or step formed in the cross-piece which connects the lower ends of the standards F of the clamp-frame, while the upper end passes through an opening drilled in the top plate *h* for that pur-

pose. This end of the screw-opening in the plate is made smaller than the main barrel of the screw, so that the upper portion of the screw immediately under the top plate *h* is turned down so as to form a shoulder, which bears against the under side of the plate *h*, thereby confining the screw and enabling it to operate the jaws. That portion of the barrel of the screw I which projects above the top plate is squared off and fitted with a key, *k*, by means of which the screw is operated. Thus constructed, the jaws G are made to project from their frame F in a line at right angles to a line drawn centrally through the mandrel H that carries the die, and with whose center the cutting-edges of the die are arranged concentrically. Again, a wedge-shaped depression is cut in the face of each jaw G in a line parallel with the central line of the mandrel, immediately facing each other, and of about the same width and depth. Thus formed, each jaw G is so arranged on the screw I that the center of the opening formed by these depressions, when the jaws are tightly closed, will be in a line with the line passing through the center of the mandrel H, so that any square or circular bolt clamped between them will have its central line coincident with that of the mandrel. By this arrangement of the jaws any bolt of suitable size having a head or other eccentric projection can be as readily clamped with its barrel in a line with the center of the mandrel as if it had been headless, as seen in Fig. 4. The carriage is made to move toward or from the die by turning the shaft E and pinion D by means of the crank-handle *l* secured to the former. The mandrel H is mounted in a suitable bearing or supporter, C, cast to the frame C′, and is made tubular throughout its entire length to give free passage to the bolts as the thread is cut. In the end next the clamp-jaws its hollow end is enlarged to receive a tubular collet or tenon, *m*, formed on the end of the screw-box or die-stock *n*. The collet *m* being inserted, the die-stock is firmly secured to the mandrel by means of a screw-bolt, *o*, passing through the mandrel into a countersink or depression cut in the outer face or periphery of the collet *m*. The die-stock proper consists of a short tube, *n*, provided in the rear with the collet *m*, above described, (see Fig. 8,) the front opening being much larger than the rear one in order to receive a cylindrical die, *p*, Figs. 5 and 7. The die is held securely in place by means of two adjusting-screws, *q*, arranged directly opposite each other, and by means of a third one, *r*, which is also used for expanding and contracting the die in a manner I will now proceed to describe here, first premising the statement that from what has already been said it will be clear that the die-stock and die are readily removable from the mandrel by simply loosening the screw *o*, and another one as easily inserted having a die differing either in size or in the pitch of its screw. The die *p* itself is formed in one piece, and is open at one, *s*, of its angles, a portion having been cut out in a line parallel with the length of the mandrel. Thus constructed, it is capable of a certain degree of expansion and contraction, so as to increase or diminish the width of the die between its cutting-edges, either to increase the depth of the screw-thread to be cut or to enable it to receive a larger or smaller screw-bolt, but principally for the first-named purpose. This is effected in this way: Suppose it is desired to increase the diameter of the die between the cutting-edges, the screws *q* are first slightly loosened to make room for the expansion of the periphery of the die; then the screw *r* is gently turned so as to drive its conical point between the lips *s* of the die, thereby forcing them apart, as seen in Fig. 5; when sufficiently expanded the other screws *q* are then tightened, as before, as well to hold the die steady as to support its sides against the strain exerted in cutting the screw. This operation is just reversed in order to diminish the diameter, the screw *r* being first loosened and then the screws *q* tightened up to the required point, as seen in Fig. 7. On the end of the mandrel which projects beyond the end of the frame of the machine is first pinned or keyed fast a toothed wheel, K, and then beyond that a collar, L, is similarly fastened—as, for instance, by a screw, *t*. Diametrically through the collar L is bored a hole for the reception of a lever, M, carrying a crank-handle, *w*, by which to operate the mandrel. The lever is made removable and also adjustable, so as to increase or lessen its leverage, by means of an adjusting-screw, *v*, arranged as shown in Fig. 4. Immediately below the mandrel and in a line therewith is arranged a shaft, N, mounted in suitable bearings X in the standards C′ of the frame that supports the mandrel. On this shaft is keyed a pinion, O, so arranged as to mesh with the teeth of the wheel K on the mandrel. This shaft is confined in its bearings by a removable pin, *u*, passed through its end just beyond the inner standard C′. Through the outer end of this shaft N is bored a hole similar to that in the collar L on the end of the mandrel; into this opening the lever M fits as it does in that of the collar L, and is intended to be used to drive the mandrel when less speed and more power are required, as in cutting the screw-head on a bolt of large diameter, or on a gas or iron water pipe. Otherwise, when the bolts are small in diameter, the shaft N with its pinion O is entirely removed from the machine, as in Fig. 11, and the end of the lever then inserted in the hole cut in the collar L on the end of the mandrel H, and the latter with the die driven from that; in both cases the bolt or other article on which the thread is being cut is fed up to the die as the thread is cut, either by the natural drag of the thread of the die, or by hand through the crank-handle *l*, which drives the pinion D.

The operation is simple. The screw I is first turned by the screw-wrench or key *k* so as to

open the jaws G of the clamp until sufficiently apart to receive the barrel of the blank and suitably-prepared bolt to be operated on; the bolt-head being placed beyond the further side of the jaws; the latter G are then brought together by the key, as shown in Fig. 4, so as to clamp the bolt firmly between them, care being taken to see that its point is properly centered; this effected, the carriage is then advanced by turning the crank *l* until the point of the bolt rests firmly and centrally between the cutting-edges of the die, on which motion is communicated to the mandrel and through it to the die, until the thread is cut as far up as is desired on the bolt. If the thread is desired to be deepened, the bolt must be withdrawn from the die by reversing the motion of the mandrel, and the die afterward adjusted so as to bring its cutting-edges closer to each other, as before described; the cutting operation is then again repeated, and so on until the thread is cut sufficiently deep. This done, the bolt is removed and a new one, suitably prepared, substituted in order to undergo the same operation.

In case a larger or smaller bolt is required to be operated on, the die-stock and die are removed entirely and another, carrrying a suitable die, substituted in its stead by merely loosening the clamp-screw *o*, and again clamping it when the new die-holder has been inserted.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improved machine herein described, consisting of the bed A, the rack *f*, and pinion D, traveling-carriage B, constructed as specified, the mandrel H, removable shaft N, gears K and O, and lever M, all combined and operating as set forth.

2. I claim the die *p* as constructed in combination with the die-stock *n*, conical screw *r*, and adjusting-screws *q*, as arranged to operate, for the purpose set forth.

DAVID McGUIRE.

Witnesses:
A. McCALLUM,
D. G. STUART.