T. T. PROSSER

MACHINE FOR ROLLING SCREW THREADS ON BOLTS AND RODS.

No. 181,010. Patented Aug. 15, 1876.

Fig. 1.

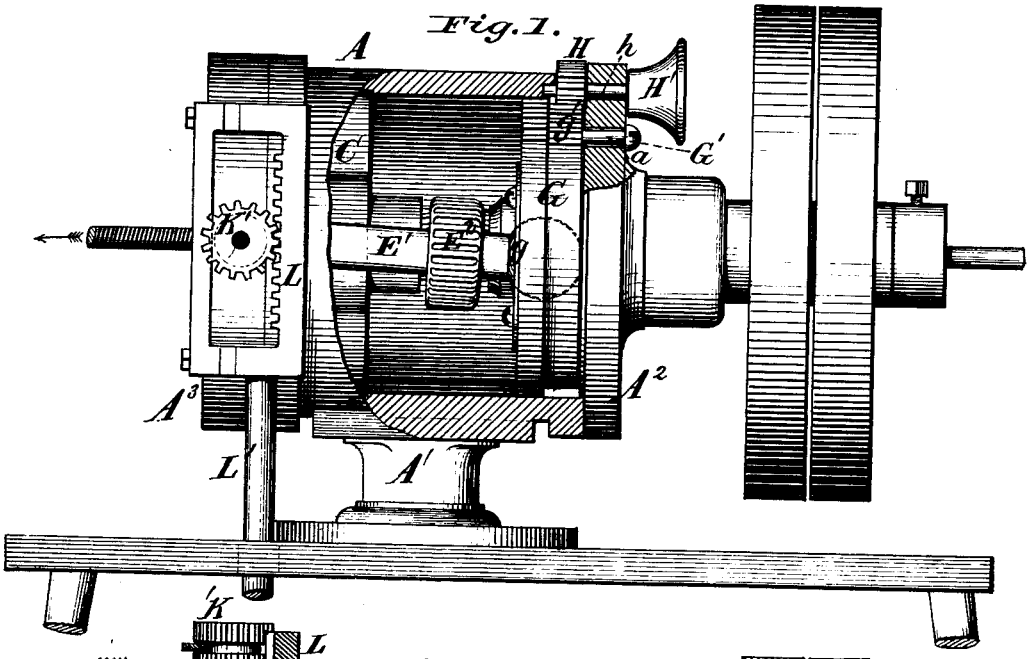

Fig. 5.

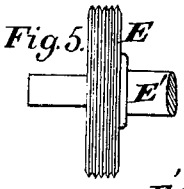

Fig. 2.

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H. L. Perine
A. Ruppert

Fig. 4.

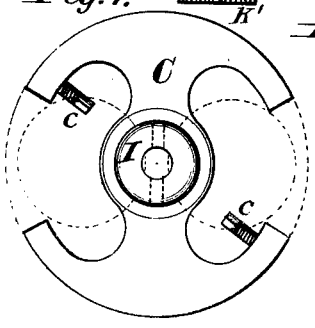
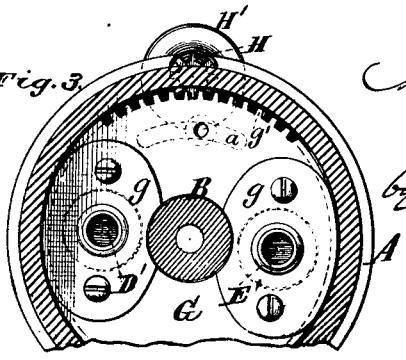


Fig. 3.



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UNITED STATES PATENT OFFICE.

TREAT T. PROSSER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN MACHINES FOR ROLLING SCREW-THREADS ON BOLTS AND RODS.

Specification forming part of Letters Patent No. **181,010**, dated August 15, 1876; application filed December 30, 1875.

To all whom it may concern:

Be it known that I, TREAT T. PROSSER, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Machines for Rolling Screw-Threads on Bolts and Rods, of which the following is a specification:

This invention relates to screw-machines which form screw-threads on bolts and rods by subjecting them to cross-rolling between a pair of rolls having annular threads on their peripheral surfaces, and revolving in different but intersecting planes and in the same direction.

My improvement consists, first, in providing for such an adjustability of the rolls that their obliquity with reference to each other can be changed to regulate the pitch of the screw-thread formed on a bolt or rod passed through between them; second, in arranging the shafts of the rolls side by side, and in such a manner that their axes will converge when in position for work in the direction in which the rolls feed, so that the threaded surfaces of the rolls will stand at a slight angle and operate gradually in rolling a screw-thread on a bolt or rod, and facilitate the feeding thereof; third, of certain novel details of construction, so fully explained in the following general description, and so specifically pointed out by the claims, that a detailed statement thereof at this point would be superfluous.

In the annexed drawings, Figure 1 is a sectional elevation of a machine that illustrates my improvements. Fig. 2 is a horizontal section of the same. Figs. 3, 4, and 5 are detail views, hereinafter more particularly referred to.

The same letters of reference are used in all the figures in the designation of identical parts.

Most of the working parts of the machine shown are arranged in a cylindrical casing, A, supported on a stand or column, A^1. The rear head A^2 of the casing has an elongated central hub to afford an extended bearing for the driving-shaft B, which carries a fast and a loose pulley on its overhung end outside of the casing. The other end of the shaft has a bearing in the central hub of a cross-bar, C, (best seen in Fig. 4,) which has segmental flanges fitting the bore of the cylindrical casing, within which it is suitably fixed by set-screws *c*. The driving-shaft is tubular from end to end, and a hole is also formed in the center of bar C, in line with and of the same size as the hole of shaft B. The teeth of a gear-wheel, B^1, cut on the driving-shaft, or of a separate gear-wheel fixed thereon, mesh into the gear-wheels D^2 and E^2 on the shafts D^1 and E^1, located on opposite sides of the driving-shaft within the casing, and drive these shafts in the same direction and at the same velocity.

The threading-rolls D and E are fixed, respectively, to the shafts D^1 and E^1, just outside of the cross-bar C. The peripheral surface of each roll has a number of annular threads formed upon it, as best seen in Fig. 5, the threads being the counterpart in cross-section of the grooves to be rolled on the bolts or rods, in order to form the desired screw-thread thereon.

The shafts of the threading-rolls turn in globe-like boxes F and F′, giving support to them at both ends. The boxes F are snugly fitted in recesses in a disk, G, and are covered by retaining-plates *g*. The disk G is loosely mounted on the driving-shaft B within the casing, between the head A^2 of which and a collar on the shaft it is suitably confined. It has teeth *g* on a portion of its periphery, to mesh into a pinion, H, by means of which it may be turned on the driving-shaft to some extent. The pinion H is fixed on a short spindle, *h*, which turns in a bearing in the head A^2, and is provided with a milled head or button, H′, for turning it. A clamping-screw, G′, enters a tap in the disk G through a sectoral slot, *a*, (best seen in dotted lines in Fig. 3,) in the head A^2, and is used to fix the disk after it has been properly adjusted by the pinion.

The boxes F′ are fitted in an extended horizontal recess in the fixed front head A^3 of the casing, so that they can be moved horizontally only.

The shafts D^1 and E^1 are so arranged by the proper adjustment of disk G that the threading-rolls turn in different but intersecting planes, as shown in Fig. 2. The pitch of the thread formed by the action of the rolls depends upon their relative obliquity, which

can be changed at pleasure by the adjustment of the disk G, so that any desired pitch may be obtained.

The globe-like boxes will readily conform to any required oblique position of the shafts D^1 and E^1, and the teeth of the gears $B' D^2 E^2$ are also suitably formed, so as to adapt them to rotate the shafts with equal smoothness in any position that they may assume. In the machine illustrated, the range of adjustment of disk G is so great that the inclination of the threading-disks can be entirely reversed, so that they can be arranged to feed in the direction of the arrow in Fig. 1, whether the driving-shaft turns in one direction or the other. The boxes F' can be adjusted laterally in the head A^3. As shown in Fig. 2, they are separated as far as the length of the recess in head A admits, and the vertical planes of the axes of the threading-rolls are about parallel. The threading-rolls are now so far apart as to freely admit between them the largest-sized bolt or rod the machine is designed to operate on, so that the rolls must be moved toward each other to make an impression on such a rod or bolt.

When the rolls are thus moved toward each other their shafts will assume a converging position, in consequence of which the threaded surfaces of the rolls will be at a slight angle at the bite, so that their threads will gradually operate. This converging disposition of the surfaces of the rolls at the bite has also a tendency to facilitate the feeding of the bolt or rod subjected to their action. The threading-rolls operate between the cross-bar C and the tubular bridge-piece or guide I, so that the bolt or rod will have a support on both sides of the rolls. The boxes F' are adjusted by right and left screw-spindles K K, turning in taps in the head A^3. Each of these screw-spindles carries a fixed pinion, K', engaging rack-teeth on a yoke, L. The stems L' of these yokes will be rigidly connected by a cross-bar, and a treadle or similar device provided for giving a vertical motion to the racks, by which the screw-spindles may be simultaneously made to force the threading-rolls with equal force against the bolt or rod to be threaded. The front head A^3 of the machine has a central aperture for the introduction and discharge of the bolts or rods.

Long rods may be fed to the threading-rolls through the hollow driving-shaft.

The casing A is closed water-tight at both ends by its heads, so that it can be filled with water, oil, or the like up to the aperture in its front head, for the twofold purpose of lubrication and keeping the threading-rolls cool, the latter of which is of special importance when the bolts or rods are heated before they are fed to the rolls. The tight casing also serves to protect nearly all the principal working parts of the machine.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for forming screw-threads on bolts and rods by cross-rolling, the combination, substantially as specified, of the threading-rolls, their shafts, and means for adjusting the shafts to change the relative obliquity of the threading-rolls, and thereby regulate the pitch of the thread to be formed.

2. In a machine for forming screw-threads on bolts and rods by cross-rolling, the peripheral threading-rolls carried on shafts which have a converging position when the rolls are at work, so that the several threads upon the rolls shall successively increase the depth of cut, substantially as and for the purpose specified.

3. In a machine for forming screw-threads on bolts and rods by cross-rolling, the combination, substantially as specified, of the shafts of the threading-rolls, the tubular driving-shaft, arranged centrally between them, and the intermediate gear-wheels.

4. In a machine for forming screw-threads on bolts and rods by cross-rolling, the combination, substantially as specified, of the threading-rolls, their shafts, the globe-like journal-boxes, and the circularly-adjustable disk, carrying the journal-boxes, in which the said shafts turn at one end.

5. The combination, substantially as specified, of the threading-rolls, their shafts, the globe-like journal-boxes, the centrally-arranged driving-shaft, the gear-wheels for rotating the threading-rolls, and the circularly-adjustable disk, carrying the journal-boxes, in which the roll-shafts turn at one end.

6. The combination, substantially as specified, of the threading-rolls, their shafts, the right and left screw-spindles, and the racks and pinions for simultaneously turning said spindles, to force the threading-rolls toward each other.

7. The combination, substantially as specified, of the tubular driving-shaft, the cross-bar affording a bearing for the inner end of said shaft, the guide in front of the said cross-bar, and the threading-rolls.

8. In a machine for forming screw-threads on bolts and rods by cross-rolling, the supporting-frame, having the form of a hollow cylinder, closed by heads at both ends, so as to form a reservoir for water, oil, or other substances used for lubricating and cooling purposes, as well as a protecting-cover for all the principal working parts of the machine.

In testimony whereof I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

TREAT T. PROSSER.

Witnesses:
HENRY PROSSER,
L. L. WILSON.