M. D. LUEHRS.

Screw-Swaging Machine.

No. 204,907. Patented June 18, 1878.

Fig. 1.

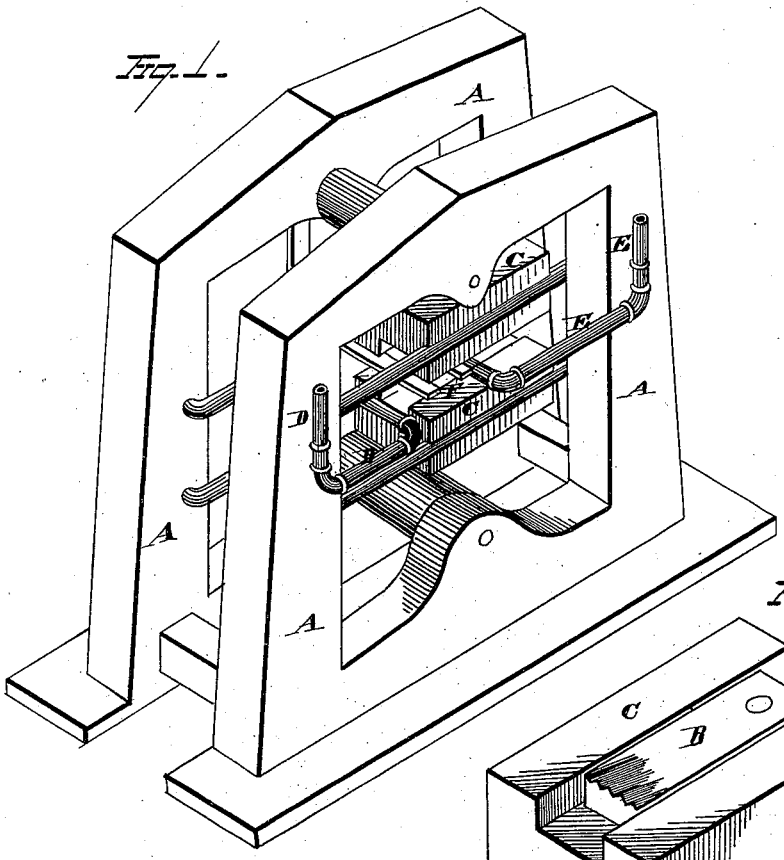


Fig. 2.

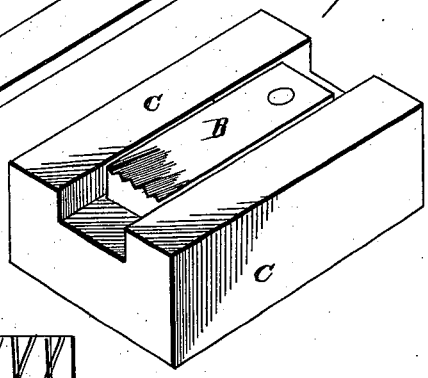
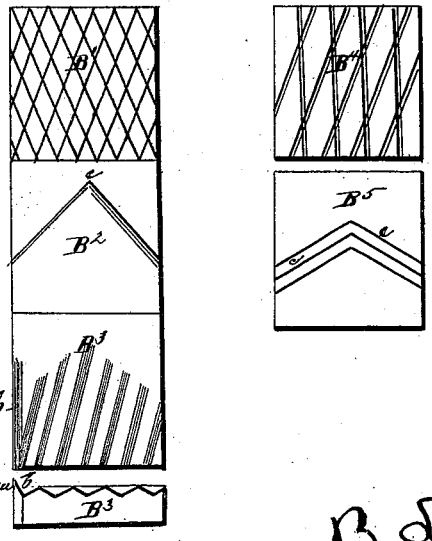


Fig. 3.



WITNESSES

Ed. F. Nottingham

A. W. Bright

INVENTOR

M. D. Luehrs.

By Leggett and Leggett

ATTORNEYS

UNITED STATES PATENT OFFICE.

MICHEL D. LUEHRS, OF CLEVELAND, OHIO.

IMPROVEMENT IN SCREW-SWAGING MACHINES.

Specification forming part of Letters Patent No. **204,907**, dated June 18, 1878; application filed February 6, 1878.

To all whom it may concern:

Be it known that I, MICHEL D. LUEHRS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Screw-Swaging Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in screw-swaging machines; and it consists in certain additions to and improvements upon a similar device for which Letters Patent No. 194,875 were granted to me September 4, 1877.

In the drawings, Figure 1 represents an isometric view of one form of device constructed according to my invention. Fig. 2 is a plan view of the lower dies and plates, the upper ones corresponding thereto. Fig. 3 represents a few of the various modifications of the dies and preparatory plates of which my invention is susceptible.

A is any suitable frame for holding and accommodating the various parts of my device.

B B are upper and nether plates, having grooves formed angularly upon their faces, substantially as shown in Fig. 2 of the drawings. These grooves are made in size, shape, number, and inclination to correspond with the screw-thread to be formed by them, inasmuch as said thread is made by being pressed between said plates B B while they are moving in opposite directions, thus leaving the imprint of the grooves upon the rod or screw-blank, which said imprint is the thread itself of the screw to be made.

The plates B are held in or attached to suitable beds or bases C, and to these beds C the power and apparatus are attached, whereby each is given a reciprocating or to-and-fro movement in opposite directions from each other. In this general respect my present device does not essentially differ from that shown in my aforesaid prior patent.

D E are pipes extending between the plates B, and so constructed as that one shall serve as a wind-blast to clear the plates, and the other to afford jets of water upon said plates.

F F are guides or gages, by means of which the rod or blank is properly presented to the plates B. These guides may be of any suitable construction and adjustment.

Coming now to a more particular specification of the plates B, it will be observed that, instead of being composed of a single piece, as shown in my said device previously patented, they are composed of several pieces, B^1 B^2 B^3 B^4. These pieces serve as the component parts of the composite plate B, and operate to first reduce the bolt or blank, as performed by part B^1; then to smooth and prepare it for the screw-forming plate, as performed by part B^2; and, finally, to form the screw-thread upon said bolt or blank, as performed by the part B^3, in substantially the same manner as set forth in my said original patent, but with this exception: In my prior device the grooves that form the screw-thread all present themselves on a line toward the blank, and the blank is simultaneously operated upon by all of them.

In my present invention it will be seen that instead of this arrangement the grooves are of different lengths, and so arranged as to form a generally pointed or angular appearance, the longest groove being at or about the middle of the plate, and the grooves upon either side thereof gradually shortening. By this arrangement the blank or bolt is first seized upon by the thread-making grooves at or near its middle portion, and is gradually operated upon from that point in both directions, thus allowing ample provision for the drawing out or stretching of the bolt or blank, which results during the operation of swaging upon its body a screw-thread, without the removal of any of its substance. This angular arrangement of the grooves constitutes a very important feature of my present invention.

The primary plate B^1 is roughened in any suitable way, preferably by the cross-grooves, as shown in the drawings, or in B^4 of the same, which two, B^1 B^4, may be interchangeably used.

B^2, or its equivalent and modification B^5, is the plate that finally prepares the blank for the operation of the grooved plate B^3. Upon

the face of this plate I put one, two, or more raised angular formations, *c*, pointing in the direction of the approaching blank or bolt.

The functions of the two plates B^1 and B^2 are, respectively, as follows: It is well known that a great deal of power is required to simultaneously reduce and round a bolt-blank preparatory to the thread-forming grooves, and on account of this fact I provide the said two plates, in order to divide the work imposed upon the machine. The first plate, B^1, accomplishes the same purpose as the blacksmith's "fuller," so called, and which is used to reduce the metal, while the second plate, B^2, accomplishes a purpose similar to the blacksmith's "flatter," which smooths the metal and removes the marks of the fuller. Hence the combination of these two plates produces a valuable result, in that the blank is first reduced in size and afterward made round and smooth, with an expenditure of as little power at any one time as is possible, while the work accomplished is very satisfactory.

The raised formations *c* with which plate B^2 is provided seize the metal blank as it comes from the reducing-plates B^1, and operates upon a portion of the same only at one time. They thus gradually round and smooth the blank until its entire body has been subjected to their action, and it is ready for the thread-forming dies.

Opposite the feeding side of the plate B^3 I provide a raised portion or abutment, *b*, against which the point of the blank is forced during the process of forming the screw-threads, and, being in a hot and softened state, the point of the blank, in being rotated against said abutment, is given a finish and a truer face than it could otherwise have, thus producing a more practical and marketable product.

The plates B^1, B^2, &c., are made to be readily detachable from their beds or bases C, so as to be readily removed for purposes of change or repair.

The advantages of making the three plates B^1, B^2, and B^3 in independent parts consist, first, in the fact that if any one of them should become broken or worn the same can be replaced in duplicate without casting all three of the plates aside. A second advantage or reason consists in the fact that in use the three plates vary in the height at which they are placed, and their surfaces are not all in the same horizontal plane. Hence, by making them in separate pieces I can properly adjust them in accurate relative position by putting "liners" under the same as they may require.

The abutment *b* may be made either as a part of the plate B^3 or in a separate piece.

The threading-dies B^3 are so attached as to permit of a slight lateral play, thus enabling them to accommodate themselves to any lateral yielding that may be required during their operation, which is frequently the case.

The abutment *b* may present a vertical, beveled, or concave face, or any other, according to the desired style of the point of the finished screw.

What I claim is—

1. In a screw-swaging machine, a thread-forming plate or die whose grooves or ridges are inclined to the longitudinal axis of the plate, and are made gradually shorter from the central portion of said grooves outward on both sides thereof, substantially as set forth.

2. The combination, with the thread-forming plate or die, of the preparatory dies B^1 and B^2, said die B^2 provided with one or more raised angular formations, *c*, pointing in the direction of the approaching blank, substantially as set forth.

3. The combination, with the thread-forming plate, of the die B^2 immediately adjoining it, said die made with the raised formations *c*, having centrally-pointed bodies in the direction of the approaching blank, and diagonal rearwardly-inclined sides, substantially as set forth.

4. The plates B, made laterally movable in their attachments.

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

MICHEL D. LUEHRS.

Witnesses:

F. TOUMEY,

W. E. DONNELLY.