(No Model.)

C. P. GROUT.

TUBE DRAWING TOOL.

No. 355,606. Patented Jan. 4, 1887.

Fig. 1.

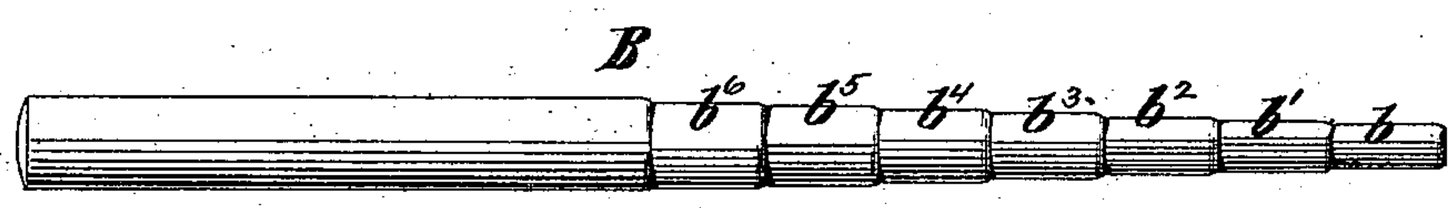


Fig. 2.

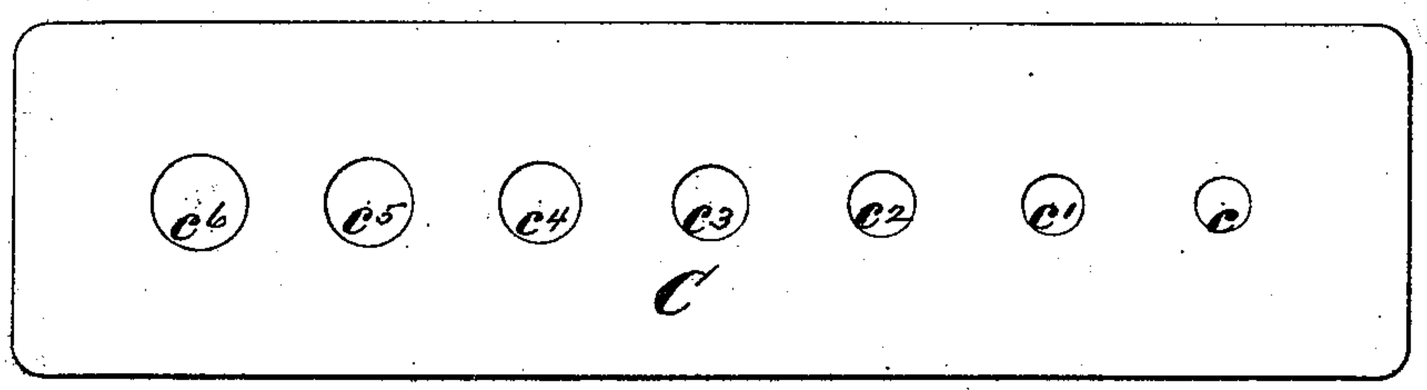


Fig. 3.

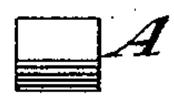
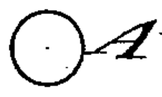


Fig. 4.



Witnesses.
Emil Hunter.
Henry J. McBride

Inventor.
Chas. P. Grout
by his Attys
Brown & Hall.

UNITED STATES PATENT OFFICE.

CHARLES P. GROUT, OF NEW YORK, N. Y.

TUBE-DRAWING TOOL.

SPECIFICATION forming part of Letters Patent No. 355,606, dated January 4, 1887.

Application filed June 9, 1886. Serial No. 204,562. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. GROUT, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Implements for Expanding, Reducing, and Condensing or Solidifying Soft-Metal Tubes or Bands, of which the following is a specification.

My invention is more particularly intended for operating upon short and comparatively small tubes or bands of metal or composition—such, for example, as block-tin—which is sufficiently soft to change its shape by the application of slight pressure; and the particular object of my invention is to provide implements or tools by which such tubes or bands of sizes ranging from one-eighth of an inch to five-eighths (more or less) in diameter, and of a length from one-quarter to one-half an inch, or thereabout, may be readily expanded or reduced in diameter, or may be condensed or solidified by slightly reducing the thickness of the metal.

The invention consists in implements for the purpose above described, including a mandrel having stepped portions of diameters gradually increasing from one end to the other of the mandrel, and a plate having a corresponding series of holes of diameters gradually increasing from one end to the other of the series, the mandrel-steps and the holes of the plate being so proportioned that any step of the mandrel and the corresponding larger hole of the plate will operate, respectively, to expand or reduce a soft-metal tube or band, and being also so proportioned that any step of the mandrel will operate with the hole corresponding to its next larger step to condense or solidify a soft-metal tube or band.

In the accompanying drawings, Figures 1 and 2 represent, respectively, the stepped mandrel and the plate provided with a series of holes which embody my invention. Fig. 3 is a side view of a short tube or band upon which the implements are intended to operate, and Fig. 4 is an end view of such a tube or band.

Similar letters of reference designate corresponding parts in all the figures.

The short tubes or bands A—such as shown in Figs. 3 and 4—may be made of block-tin, or any other metal or composition which is sufficiently soft to readily change its shape and size by the application of comparatively slight pressure—such as may be produced with the tools or implements hereinafter described—and by the hands or manually.

B designates the mandrel, which is formed with stepped portions b b' b^2 b^3 b^4 b^5 b^6, of a diameter gradually increasing from one end of the mandrel toward the other.

C designates a plate which has in it a series of holes, c c' c^2 c^3 c^4 c^5 c^6, gradually increasing in diameter from one end to the other of the series.

Of course the mandrel may have any desired number of steps varying in diameter from one to the other, as may be required for the particular purpose used, and the plate C may likewise have any suitable corresponding number of holes in a series increasing by as great or small graduations in diameter as may be desired.

The stepped mandrel and plate B C may be formed of metal or hard wood—such as box-wood—and I have found by practical use that wood will answer for small tubes or bands made of block-tin. Each step b^2, for instance, in the mandrel is made somewhat smaller than the corresponding hole, c^2, in the plate C, and such corresponding step and larger hole serve, respectively, to expand or reduce the diameter of the tube or band A. For example, if the tube or band will slip easily over the step b^2, and it be desired to expand it, it may by the fingers be pushed forward onto the step b^3, and will thereby be expanded to a degree corresponding to the difference in diameter between the two steps b^2 b^3. If, on the other hand, a band or tube, A, is found to be somewhat larger than is desired for the purpose intended, and will slip very easily through the hole c^3, for example, it may by slight pressure be forced through the hole c^2, and will thereby be reduced in diameter. Not only should the steps of the mandrel and the holes of the plate be so proportioned that any step of the mandrel and the corresponding larger hole of the plate—b^2 c^2, for example—will act, respectively, to expand and reduce the size of the tube or band, but they should also be so proportioned that by the operation of one step—b^2, for example—in

connection with the next larger hole of the plate—c^3, for example—the tube or band may be condensed or solidified—that is to say, if the tube or band will slip snugly upon the step b^2 of the mandrel without any expanding, it may be condensed or solidified by leaving it upon the step b^2, and then forcing it while upon said step through the hole c^3, which corresponds to the next larger step, b^3, of the mandrel.

Although the tools or implements above described may be used for expanding, reducing, and condensing or solidifying soft-metal tubes for various purposes, I may here mention that one purpose for which such soft-metal tubes or bands may be employed is to obtain the exact size and shape of teeth preparatory to the fitting of permanent caps or crowns of gold or other metal upon them, such use of the soft-metal tubes or bands being described in my United States Letters Patent No. 319,238, dated June 2, 1885.

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

The implements herein described for expanding, reducing, and condensing or solidifying soft-metal tubes or bands, consisting of a mandrel having stepped portions of diameters gradually increasing from one end to the other of the mandrel, and a plate having a corresponding series of holes of diameters gradually increasing from one end to the other of the series, the mandrel-steps and the holes of the plate being so proportioned that any step of the mandrel and the corresponding larger hole of the plate will operate, respectively, to expand or reduce a soft-metal tube or band, and that any step of the mandrel will operate with the hole corresponding to its next larger step to condense or solidify a soft-metal tube or band, substantially as herein described.

CHAS. P. GROUT.

Witnesses:
C. HALL,
FREDK. HAYNES.