No. 620,955. Patented Mar. 14, 1899.

J. A. McGREGOR.

MACHINE FOR TAPERING CYLINDRICAL BLANKS.

(Application filed Mar. 26, 1898.)

(No Model.) 4 Sheets—Sheet 1.

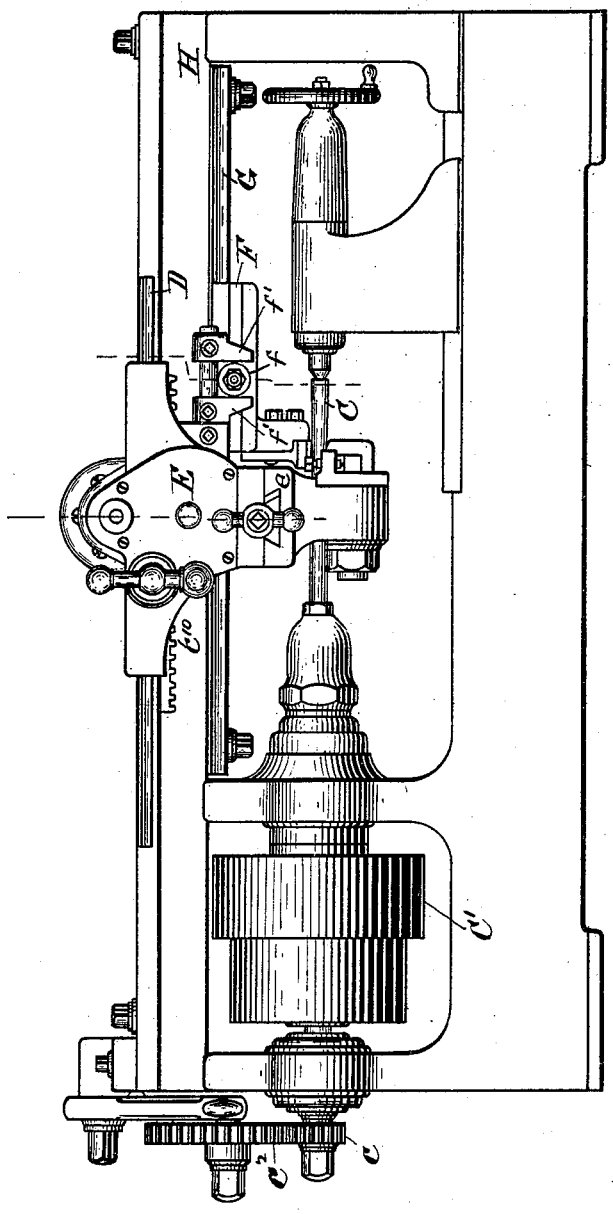

Fig. 1.

WITNESSES

E. B. Tomlinson.

E. D. Chadwick.

INVENTOR

John A. McGregor

by Alex. P. Browne

attorney

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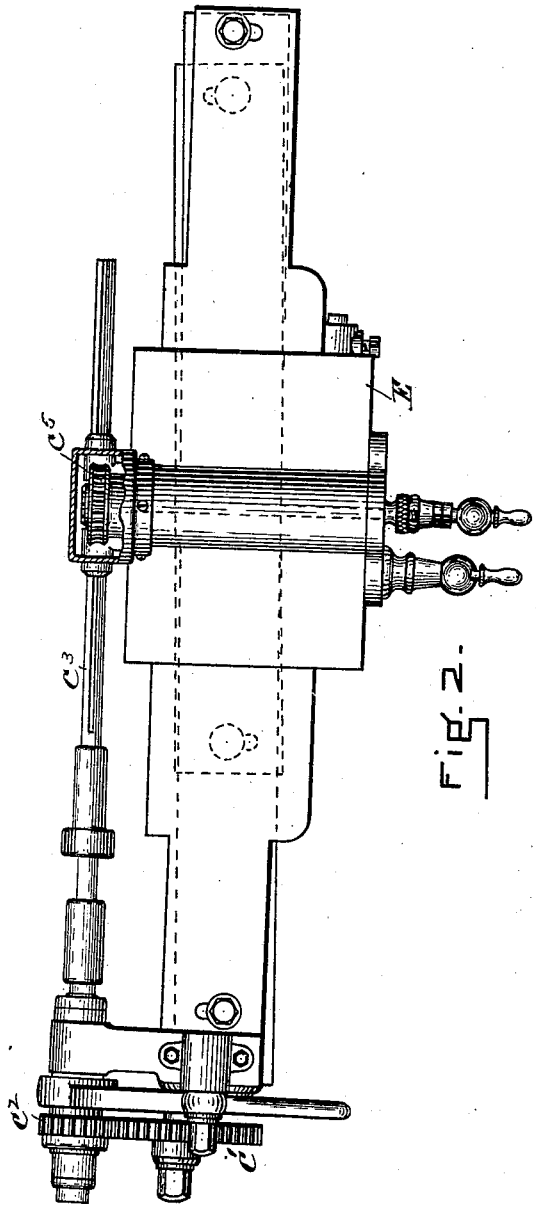

Fig. 2.

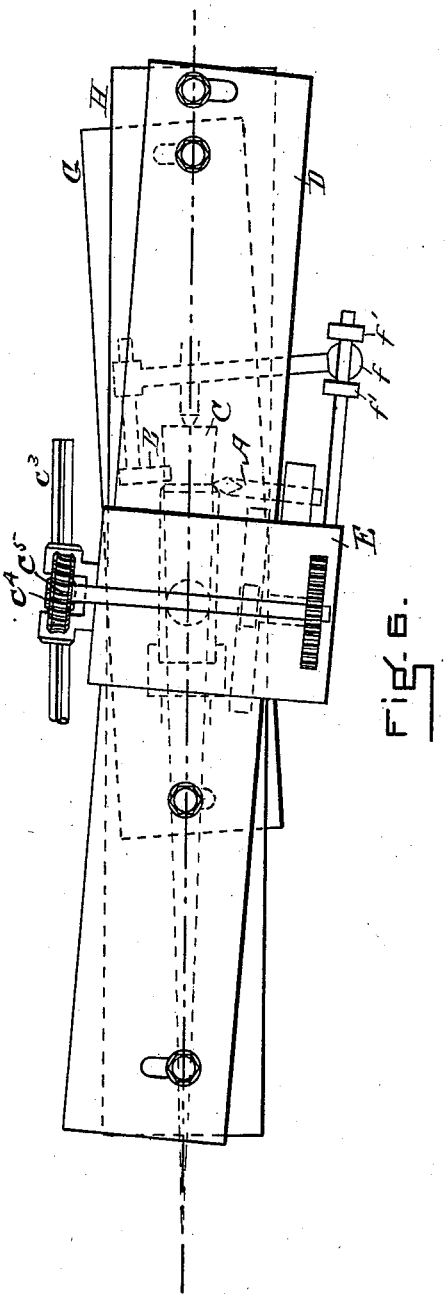

Fig. 6.

WITNESSES

E. B. Tomlinson.

E. D. Chadwick.

INVENTOR

John A. McGregor

by Alex. P. Browne

attorney

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(No Model.) 4 Sheets—Sheet 3.

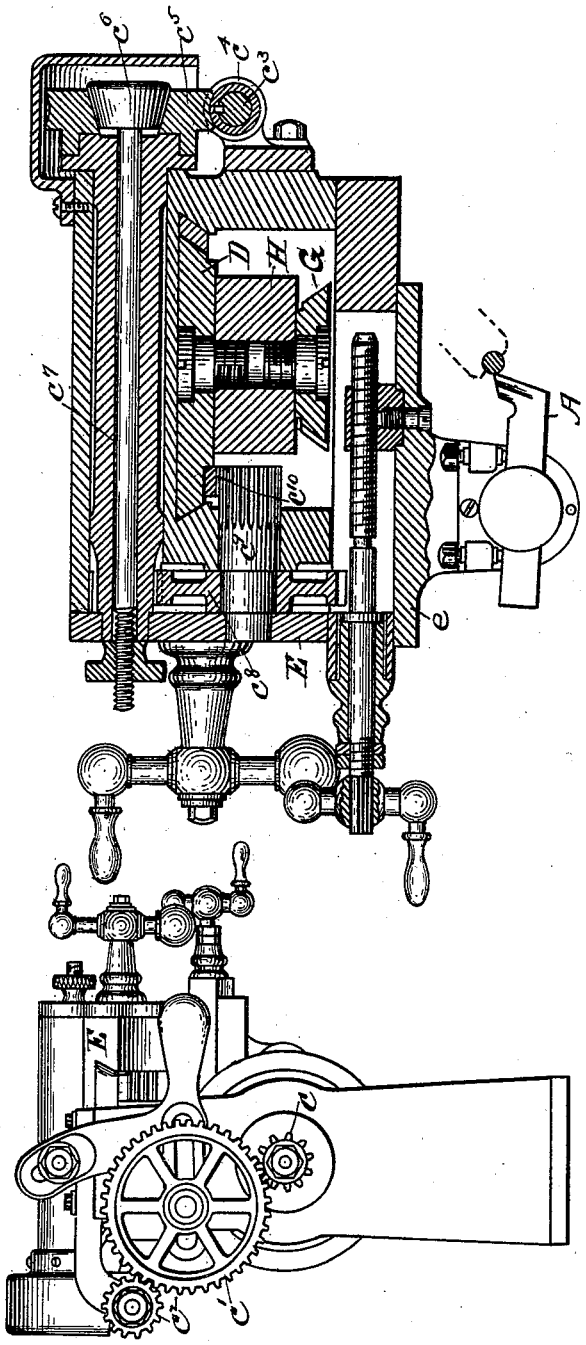

Fig. 4.

Fig. 3.

WITNESSES

E. B. Tomlinson.

E. D. Bradwick.

INVENTOR

John A. McGregor

by Alex. P. Brown & Co.

attorneys

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J. A. McGREGOR.

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(No Model.) 4 Sheets—Sheet 4.

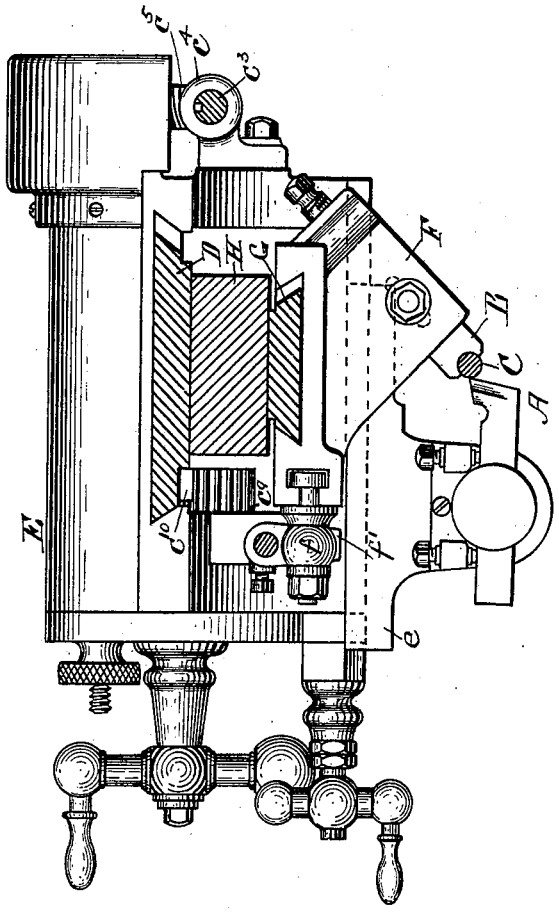

Fig. 5.

WITNESSES

E. B. Tomlinson.

E. D. Bradwick.

INVENTOR

John A. McGregor
by Alex. P. Browne
attorney

UNITED STATES PATENT OFFICE.

JOHN A. McGREGOR, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR TO THE MORSE TWIST DRILL AND MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR TAPERING CYLINDRICAL BLANKS.

SPECIFICATION forming part of Letters Patent No. 620,955, dated March 14, 1899.

Application filed March 26, 1898. Serial No. 675,244. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. McGREGOR, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Machines for Tapering Cylindrical Blanks, of which the following is a specification.

My invention relates to improvements in machines for tapering cylindrical blanks, particularly those to be manufactured into twist-drills; and its object is to produce articles of this character more readily and accurately than has heretofore been accomplished.

It is well known that the "twist-drill," so called, is constructed with a gradual taper or decrease of thickness from point to shank for purposes of clearance. This decrease is according to the best practice of very small extent or amount relatively to the length of the tool; but its accuracy in the finished article is essential as going to make up the best quality of such devices.

Heretofore the tapering of the blank in all sizes above the smallest has been obtained by causing a turning-tool to pass over the surface of the blank while the same is being rotated, this turning-tool at the same time being caused to move gradually toward the axis of rotation of the blank, so as thereby to produce the degree of taper required. It has been found in practice that with the smaller sizes of blank—say from one-half to three-eighths of an inch down—the thrust of the turning-tool, especially as it becomes dulled, has been sufficient to overcome the natural stiffness of the stock, and thus bend it out of alinement, with the result that the blank does not receive a true taper and must undergo subsequent hand-filing.

The object of my invention is to overcome this difficulty and produce at a single operation an accurately-tapered blank of a cross-section so small that the operation of tapering cannot be accurately performed in the ordinary manner. I accomplish this result by providing in connection with and in opposition to the turning-tool a work-support or back-rest adapted to travel along the rotating blank and bear against the same opposite to the bearing or thrust of the turning-tool, whereby at each point or step in the operation of tapering the work shall be held or backed up accurately to the tool, and thus a true taper insured. I do this by giving to both the turning-tool and the back-rest motion in a path inclined to the longitudinal axis of the blank to correspond to the degree of taper, each such path being oppositely inclined as regards the other.

In the drawings, Figure 1 is a front elevation of the machine. Fig. 2 is a top plan view. Fig. 3 is an end view. Fig. 4 is a vertical central section showing the carriages hereinafter described in a central position. Fig. 5 is an end view opposite to Fig. 3, showing in cross-section the slides and bed hereinafter described. Fig. 6 is a diagrammatic plan hereinafter more particularly referred to.

The machine shown in the drawings is in its essence a drill-tapering machine of the lathe type wherein a turning-tool A and an opposed back-rest B (see Fig. 5) are caused to move together over opposite sides of a rotating blank C, Figs. 1 and 5, and as they move to approach equally toward the longitudinal axis of the blank. The endwise or longitudinal motion of the tool and rest and the rotary motion of the blank may be given by any motion appropriate to and commonly employed in lathes for this purpose. In the machine shown in the drawings I have represented the motion of the tool and rest as performed by a rack-and-pinion connection between a suitable source of power and the carriage upon which the tool is mounted and to which the carriage of the back-rest is also connected.

What I have above termed a "rack-and-pinion" connection between the source of power and the carriage consists, in the machine shown in the drawings, of the pulley C', which drives the gear c and intermediate gearing c' c^2 to a shaft c^3, (best shown in Fig. 2,) which carries a worm c^4, meshing with a worm-gear c^5, (see Fig. 4,) which through a friction c^6 drives a pinion-shaft c^7, the pinion of which engages with the gear c^8, the shaft of which c^9 is formed with teeth which engage a rack c^{10} upon a stationary slide-rail D. The shaft c^7 is journaled in the tool-carriage E, and hence when the shaft is revolved by means of the

intermediate mechanism above described longitudinal motion is imparted to the tool-carriage over and upon the slide-rail D. Upon this tool-carriage is adjustably mounted a part *e*, containing the tool-holder proper, this adjustment being clearly shown at Fig. 4 and being for the purpose of adjusting the tool to the size of the blank to be worked upon.

The back-rest carriage F (well shown at Figs. 1 and 5) is connected or caused to engage with the tool-carriage by means of a stud *f*, Fig. 1, lying between a pair of dogs *f'*, attached to the tool-carrier. The back-rest is also made adjustable in its carriage to and from the center of the blank. The back-rest carriage is supported and adapted to slide upon a slide-rail G, Figs. 4 and 5, which, together with the slide-rail D of the tool-carriage, is pivotally mounted upon a suitable portion of the longitudinal frame of the machine, as H. This pivotal connection is well shown at Fig. 4. The rotation of the blank is obtained directly from the pulley C' and its shaft in a well-known manner.

The modified taper-producing motion of the tool and rest is obtained by adjusting the slide-rails D G at the required angle to the central axis of the blank. In practice this amount of adjustment is obviously very slight; but in order to represent it I have caused it to be shown diagrammatically at Fig. 6 upon a large scale relatively to the scale of the machine. These two rails so adjusted or inclined cause the turning-tool and back-rest as they move over the blank to gradually approach its center, while at the same time approaching each other. In this way a true taper is formed upon the blank, the blank itself being always held by the back-rest truly up to the edge of the turning-tool.

I have shown and described my invention as embodied in a machine particularly adapted for tapering drill-blanks, in which case the tapering is performed from large to small; but I believe it to be obvious that it may be employed in producing other tapered articles of the same general character, including those in which it may be desirable to perform the tapering from small to large.

I claim—

A machine for tapering cylindrical blanks, having a taper-turning tool and opposed back-rest, said tool and back-rest being independent of each other and each being mounted on a separate sliding carriage, a slideway for each carriage arranged at an angle to the long axis of the blank corresponding to the taper desired, and means for revolving the blank to be tapered and simultaneously moving the taper-turning tool and back-rest lengthwise of the revolving blank and in contact therewith, as set forth.

In testimony whereof I have hereunto subscribed my name this 22d day of March, 1898.

JOHN A. McGREGOR.

Witnesses:

FREDERICK D. STETSON,

ISABEL F. MURPHY.