W. SELLERS.

Machine for Turning Metal Shafting.

No. 20,446. Patented June 1, 1858.

Fig. 4

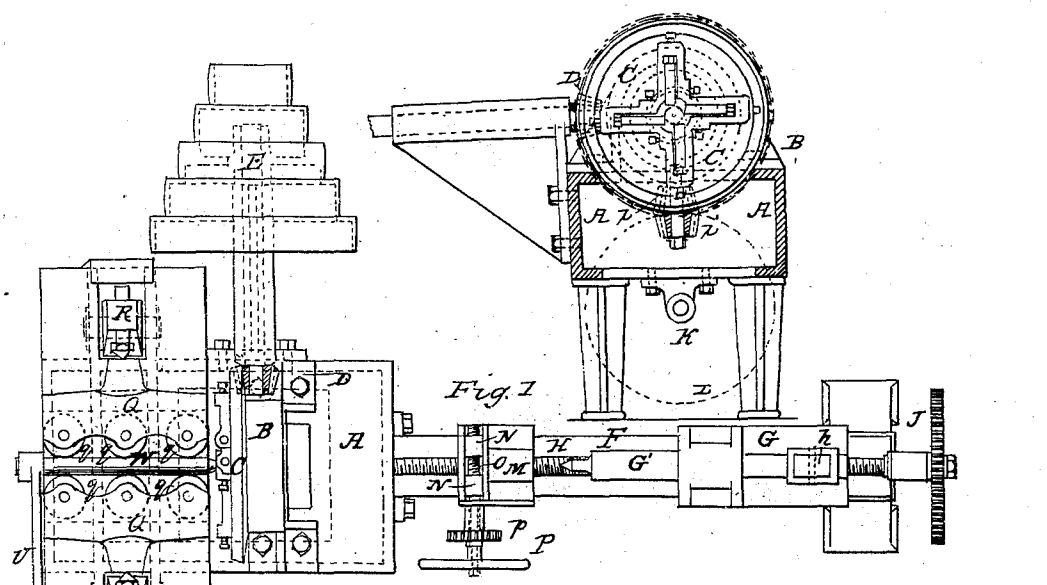


Fig. 1

Fig. 3

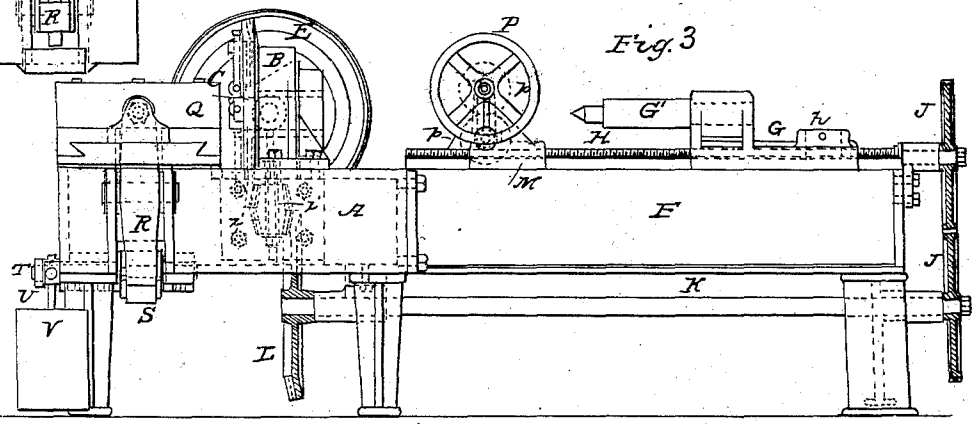


Fig. 2

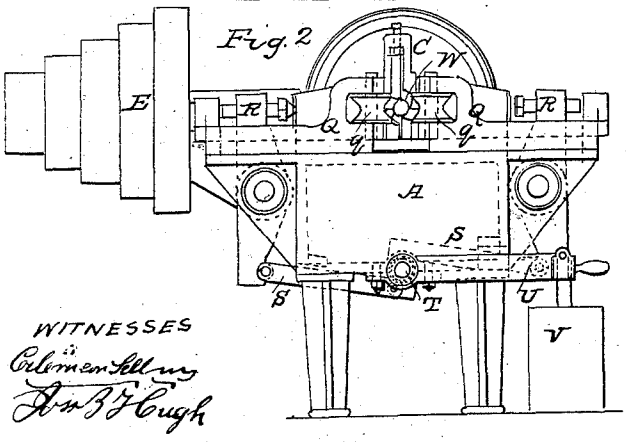


Fig. 5

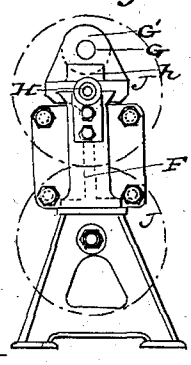
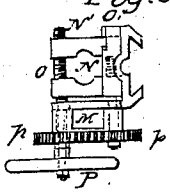


Fig. 6



WITNESSES

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WILLIAM SELLERS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVED LATHE FOR TURNING METAL SHAFTING.

Specification forming part of Letters Patent No. **20,446**, dated June 1, 1858.

To all whom it may concern:

Be it known that I, WILLIAM SELLERS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Machine for Turning Metal Shafting or Bars, Cylindrical Rings, and Cutting Screws; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a plan. Fig. 2 is an end elevation. Fig. 3 is a side elevation. Fig. 4 is a sectional elevation in front of the cutter-head. Fig. 5 is an elevation of the opposite end from Fig. 2, and Fig. 6 is a side elevation of the chuck for holding the shaft.

The object of my invention in the turning of shafts or cylindrical rings, with a view to leave them perfectly true when finished, is to sustain the metal bars during the operation in such manner as to prevent vibration, however such bars may be out of true when put in the machine; and to obtain the said result the mode of operation of my said invention consists in combining, with suitable rotating cutters or instruments for cutting or reducing the surface of a bar, a guide bar or bed having one or more chucks or rests sliding thereon to gripe and hold the bar at given distances apart, to keep the said bar from turning, to hold it in line, and to prevent vibration, the said chucks or supports being so arranged that they shall move toward the rotating cutters in the direction of the axis of the finished bar or ring, and that they may be removed in succession as the operation progresses; and it also consists in combining, with the foregoing combination, suitable supports to sustain the bar in a central position beyond the cutters, whether said supports be or be not self-adapting to any slight inaccuracy in the finished bar; and it also consists in combining, with the foregoing combination, a mode of sustaining in a central position that end of the bar which is first to be operated upon by the cutters.

The mode of construction which I have tried with success is as follows: I provide a bed-piece, A, supported at such a height as may be convenient to the workman, near the center of which I place a stand, B, which serves as a bearing for the bevel-wheel and cutter-head C, and is so arranged as to allow the wheel and cutter-head to rotate freely, but without any vibration.

A hole must be made through the center of the cutter-head of sufficient size to admit the largest shaft the machine will operate upon. On the front end or face-plate of this head any number of cutters may be placed that may be deemed most serviceable. I prefer four, which are placed radially and are retained in their places and adjusted by two set-screws to each cutter.

Motion is communicated to the cutter-head by means of the bevel-wheel, forming part of the head, the pinion D, and cone-pulley E.

To the end of the bed-piece A farthest from the cutters I attach a long bed-piece or guide-bar, F, in line with the axis of the cutter-head C, and having its upper surface planed perfectly smooth and true, and of such form as to receive the sliding stand G and allow it to move freely the whole length of the bed-piece F without any lateral or vertical movement whatever.

In one end of the sliding stand G, I place a male center, G′, and a feeding movement is communicated from the cutter-head C to the stand G by means of the screw and nut H and *h*, wheels I I, shaft K, bevel-wheel L, and double bevel-pinion *i i*.

The nut *h* is made so as to be readily thrown out of gear with the screw for the purpose of giving a quick return motion to the sliding stand G.

On the upper surface of the bed-piece F, and between the sliding stand G and cutter-head C, I place one or more sliding chucks, M, which are arranged to slide freely thereon, in a similar manner to the stand G.

The bed-piece F is of such a height above the bed-piece A as to allow the chucks M to slide off the end of the bed-piece F onto the top of the bed-piece A, on which it can be moved to one side or lifted off entirely, as may be desired.

The chuck M is provided with two vertical jaws, N N′, having V-shaped recesses in one side of each and opposite each other for the purpose of clamping the shaft to be turned. These jaws are opened or closed simultane-

ously by means of the right and left hand screws O and O′, hand-wheel P, and gear-wheels *p p*.

One of the jaws, N′, is made in two pieces, the upper one falling into the lower one in such a manner as to hold it firmly in the direction of the axis of the screws, but allowing it to swing freely around the axis of the upper one, the object being to unclasp it from the shaft while the machine is in motion, and remove the chuck from the bed-piece before the sliding stand G shall be brought in contact with it by the operation of the feed-screw H.

The V-shaped jaws must be very carefully adjusted, so as to bring the sides of the jaws equidistant from the axis of the cutter-head C.

On the other end of the bed-piece A, I place two slides, Q Q, having their line of motion at right angles to the axis of the cutter C, and supporting V-grooved rollers *q q q*, made exactly of one size and shape. The axis of these rollers should be perpendicular to the plane of motion of the slides Q Q, and their line of centers must be parallel to the axis of the cutter-head C. The slides Q Q are connected together by means of the levers R R, connecting-rods S S, and rock-shaft T. The rock-shaft T is firmly attached to the under side of the bed-piece A in such a manner as to allow it to vibrate freely about its axis; but in every other direction it should be perfectly rigid.

On the outer end of the rock-shaft T, I place an arm, U, having a weight, V, suspended upon its outer end, for the purpose of forcing the slides Q Q together and the rollers *q q q* upon the piece of metal which is being turned. The slides Q Q may be adjusted so as to bring the centers of the rollers *q q q* equidistant from the axis of the cutter-head, by means of the set-screws *t t* in the upper end of the levers R R. I also provide a cylindrical piece of metal, W, having one end turned conical, so as to form a male center, for the purpose of supporting one end of the shaft to be turned. The axis of this piece W is supported in a line with the axis of the cutter-head C by the rollers *q q q*, and is intended to sustain the end of the shaft before and while it enters the cutters, and insure the turned part of the shaft being concentric with the center in the end thereof.

To put the machine in operation, I place the centering-mandrel W (which, for convenience of setting, should be of the same size as the shaft to be turned when finished) between the rollers *q q q*, and allow the weight V to force the rollers against its opposite sides, thereby holding it firmly. I push this mandrel forward until a portion of it has passed beyond the revolving cutters, and by means of the set-screws *t t* I adjust it so as to be exactly in line with the axis of the cutter-head. I then set down the cutters so as just to touch the mandrel, which, as before stated, is the size of the bar to be turned when finished. The bar to be turned must first be centered and straightened sufficiently to have the diameter to which it is to be reduced within its lines, as is usual with any of the present methods of turning. It is then placed in the machine and supported on the centers W and G′, in the same manner as in an ordinary lathe. While it is thus freely suspended turn it on its centers, and by trial select such places as are nearest concentric with the axis of the cutter-head, and on these places attach the chucks M, which serve to prevent the shaft from turning under the operation of the cutters, and if they are placed close enough will also prevent any vibration on the entering side of the cutters, and continue to sustain the bar in its true and central position. Power may now be applied to the cone-pulley E, and the nut *h* placed in gear with the feed-screw. The sliding stand G with its center will now force the shaft forward, while the revolving cutters will remove the superfluous metal as it is presented to their operation, the shaft being held as first described. After the operation has progressed long enough to push back the mandrel-center W, the turned part of the shaft will take its place, and as each successive chuck M comes to the center stand B it is released from the shaft by the workman and removed, as before described.

The operation is continued until the sliding stand has pushed the shaft entirely through the cutters, and it is held entirely by the rollers *q q q*, when it may be removed and another substituted.

It is evident the mandrel-center W and the sliding stand G and center G′ may be fixed on the bed-piece, and the cutter-head C and roller-slides Q Q be made to slide from one end of the shaft to the other, the operation of reducing and holding the shaft being the same in both machines.

It will be obvious from the foregoing that bars of different diameters along different portions of their length may be worked on this machine by changing the adjustment of the cutters as the operation progresses; and it will also be obvious that by the use of suitable cutters and proper gradation of the feed-motion, as is well known to machinists, screw-threads of any pitch may be cut on bars.

For turning cylindrical rings, the rotating cutters and the supports for sustaining the ring in a central position beyond the cutters may be fixed on one bed, as before, while the chucks for holding the ring before it is turned may be attached to a revolving plate, the distance from the center of the plate determining the curve of the ring; or, if the curve should never require changing, the chucks may slide on a curved bed similar to the one used for straight work.

I do not wish to be understood as limiting my claim of invention to the special construction herein specified, as it will be obvious to the skillful machinist, from the modifications suggested, that the mode of application of my said invention may be greatly varied.

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

In combination with rotating cutters, substantially as described, the employment of a guide-bar and sliding chucks, or their equivalents, for the purpose of keeping the rough bar in the line it is intended to have when finished, and preventing it from turning or vibrating during the operation, substantially as described, and for the purpose specified.

WILLIAM SELLERS.

Witnesses:

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JOS. B. HOUGH.