H. C. BULL.

Machine for Boring Gun-Barrels.

No. 195,882. Patented Oct. 9, 1877.

FIG. 1.

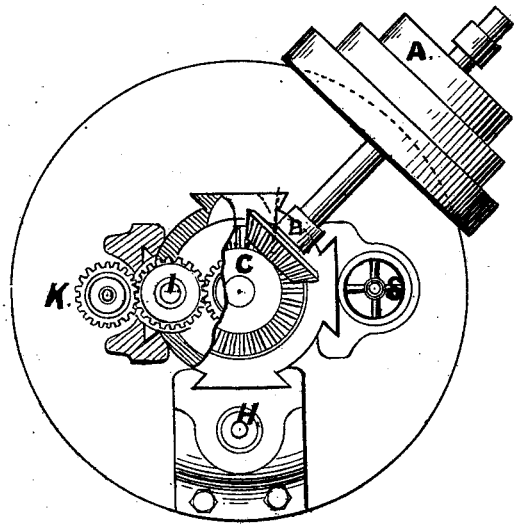
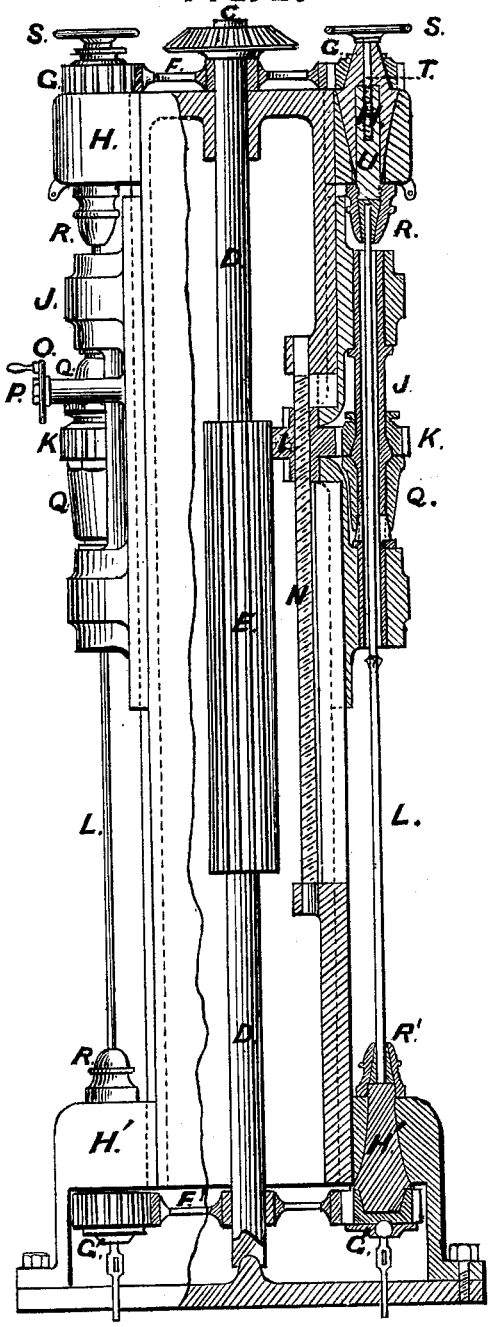


FIG. 2.



WITNESSES

A. J. Pollock

Chas L. Camp.

INVENTOR

Henry C Bull.

UNITED STATES PATENT OFFICE.

HENRY C. BULL, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-THIRD HIS RIGHT TO WILLIAM L. HEADLEY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR BORING GUN-BARRELS.

Specification forming part of Letters Patent No. **195,882**, dated October 9, 1877; application filed August 20, 1875.

To all whom it may concern:

Be it known that I, HENRY C. BULL, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Machinery for Boring Gun-Barrels; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the figures and letters marked thereon, and in which—

Figure 1 is a top view or plan of the machine; and Fig. 2, a front elevation, partly in section.

The same letters indicate the same parts in both drawings.

The object of my invention is to secure accuracy in the boring of gun-barrels, and also rapidity in the performance of the work.

To enable others skilled in the art to make and use my invention, I will now particularly describe the construction and operation of the same.

The machine, as shown in Fig. 2, is constructed on a vertical column, and has four sets of boring apparatus attached to it on its opposite sides, or provision for four such attachments, as shown in Fig. 1. In the center or axis of this column there is an upright shaft, D D, having a step or end bearing in the center of the bottom plate, and a collar-bearing at its upper end in the top portion of the column. The shaft D D is made to project above the top of the column, and has attached to it the bevel-wheel C, which is driven by the bevel-pinion B on the horizontal shaft, as shown in Fig. 1, and upon which, also, is the cone A, so as to permit of the machine being driven at greater or less speed, as may be required. This cone-shaft is the first mover of the machine; but all the other movements are taken from the central shaft D D.

Immediately above the column, and beneath the bevel-wheel C, is a large spur-wheel, F, keyed fast to the shaft D D and gearing into the pinions G G, for a purpose which will be presently explained, and there is also a similar spur-wheel, F′, attached to the lower end of the shaft D D, and gearing into the pinions G′ G′, which are of the same size as the pinions at the upper part of the machine.

The pinions G and G′, being driven by the wheels F and F′ on the central shaft D, rotate the boring arbor or mandrel L by both its ends simultaneously, and thus communicate double the force to the cutter without increasing the torsional strain upon the boring-mandrel.

The gun-barrel to be bored out is mounted on a sliding carriage, J, which has a vertical movement slightly in excess of the length of the gun-barrel, which slider or carriage is secured to the column by dovetailed bearings and gibs, as shown in Fig. 1, and is made to move up and down by means of the traveling pinion I, attached to the slider or barrel-carriage, and working within the column. This pinion gears into the long pinion E upon the central shaft D D, which central pinion E must be fully the length of the gun-barrel, so as to keep the intermediate pinion I always in gear with it.

The gun-barrel to be bored is secured within a tubular carrier, which is attached by journals and bearings to the slider. This tubular carrier has upon its middle part the pinion K, which gears into the intermediate pinion I, thus causing the gun-barrel to rotate on its axis with a motion contrary to that of the boring-mandrel, the effect of which compound movement is to make the bore of the barrel perfectly true.

The boring-bar L has separate spindles H and H′ at its upper and lower ends, to which it is secured by the screw-chucks R R′, and these spindles connect with the driving-pinions G and G′ by means of conical friction-clutches, as shown, so as to be readily thrown out of gear when it is desired to stop one of the boring-arbors.

The spindle H′ on the upper end of the boring-bar is furnished with an internal mandrel, U, having the chuck R on its lower end, and having also the screw T tapped into it from the upper end. The neck of this screw passes up through the axis of the spindle to the hand-wheel S, which has a bearing on the top of the spindle.

The object of this mechanism is to bring a tensile strain on the boring-bar, and thereby adding very materially to its stiffness and the accuracy of the operation.

Q Q are chucks for the purpose of holding the gun-barrel in the barrel-carriage.

The machine being arranged and constructed as described, power and motion are communicated to it by a belt running on the cone-pulley A, and then, by means of the bevel-wheels B and C, to the central shaft D, carrying the central spur-wheels F and F′ at the top and lower part of the machine, which drives the pinions G and G′, attached to the carriers or spindles of the boring-bar, and thus operating it from both its ends simultaneously, the gun-barrel in the meantime being rotated on its axis in a contrary direction by the gears K, I, and E, as described.

I have herein described an operative device or mechanism; but I do not mean to confine or limit myself to the exact details of construction herein shown and described, as the same may be varied considerably without thereby changing the principle of my invention—as, for instance, instead of using the feed mechanism for the barrel slider or carriage, as shown, a rack-and-pinion arrangement operated by hand, by means of the crank-wheel O and spindle P, may be substituted; or such arrangement might be made automatic, as in the feed-motion of engine-lathes, and other modifications might be suggested.

I therefore claim the right to vary the construction of the machine as circumstances may suggest or require, so long as the principle of the invention remains unchanged.

Having thus described my invention, and the mode of operating the same, what I claim therein as new, and desire to secure by Letters Patent of the United States, is—

1. An improved gun-barrel-boring machine, in which the boring-arbor is rotated by the equal and simultaneous application of the operating force or power to its opposite ends, in the manner, and by the means, and for the purpose substantially as described.

2. An improved gun-barrel-boring machine, in which the boring-arbor and the gun-barrel are rotated in opposite directions, in the manner and by the means substantially as described.

3. An improved boring-machine for gun-barrels or other purposes, in which the boring-arbor is stiffened by imparting to it a longitudinal or tensile strain, by the means substantially as described.

HENRY C. BULL.

Witnesses:
A. J. A. POLLOCK,
CHAS. L. CAMP.