(No Model.) 3 Sheets—Sheet 1.

C. A. KING.

MACHINE FOR TURNING GUN BARRELS AND OTHER ARTICLES OF IRREGULAR FORM.

No. 297,418. Patented Apr. 22, 1884.

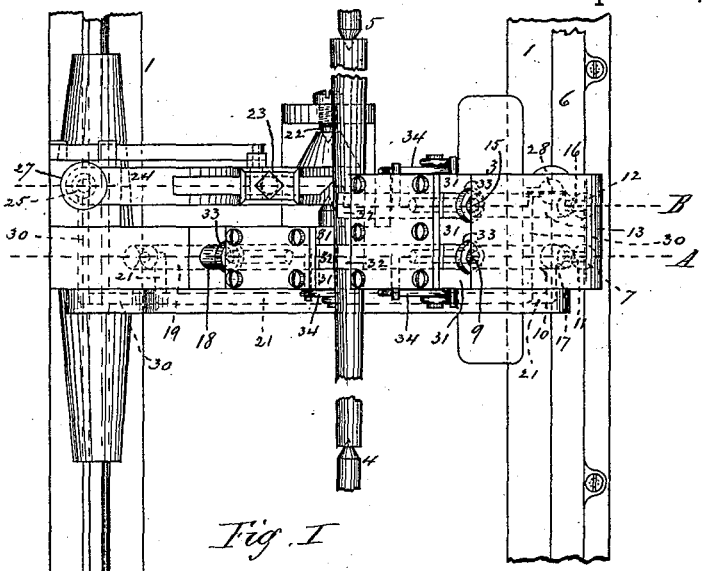

Fig. I

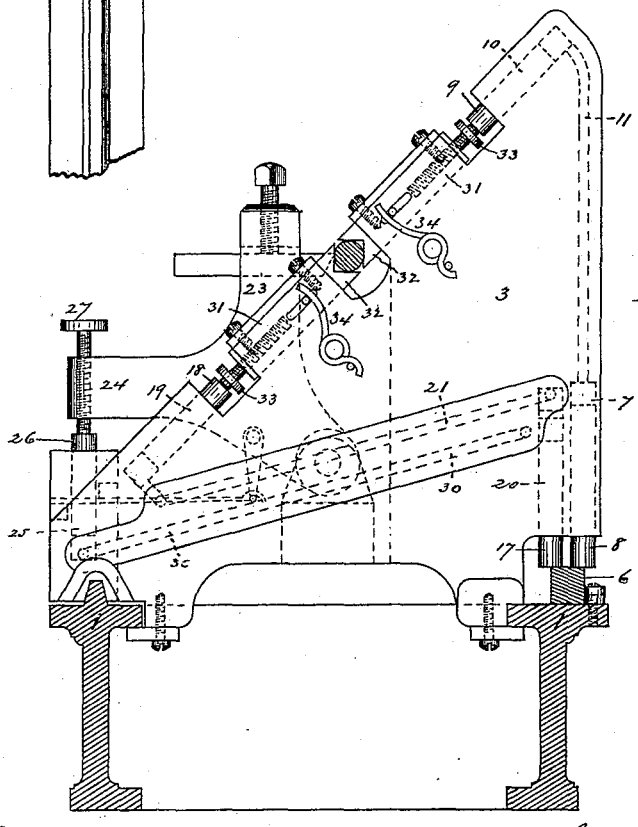

Fig. II

Witnesses.
George O. Curtis
Chas. H. Wood.

Inventor.
Charles A. King
By T. A. Curtis,
his atty.

(No Model.) 3 Sheets—Sheet 2.

C. A. KING.

MACHINE FOR TURNING GUN BARRELS AND OTHER ARTICLES OF IRREGULAR FORM.

No. 297,418. Patented Apr. 22, 1884.

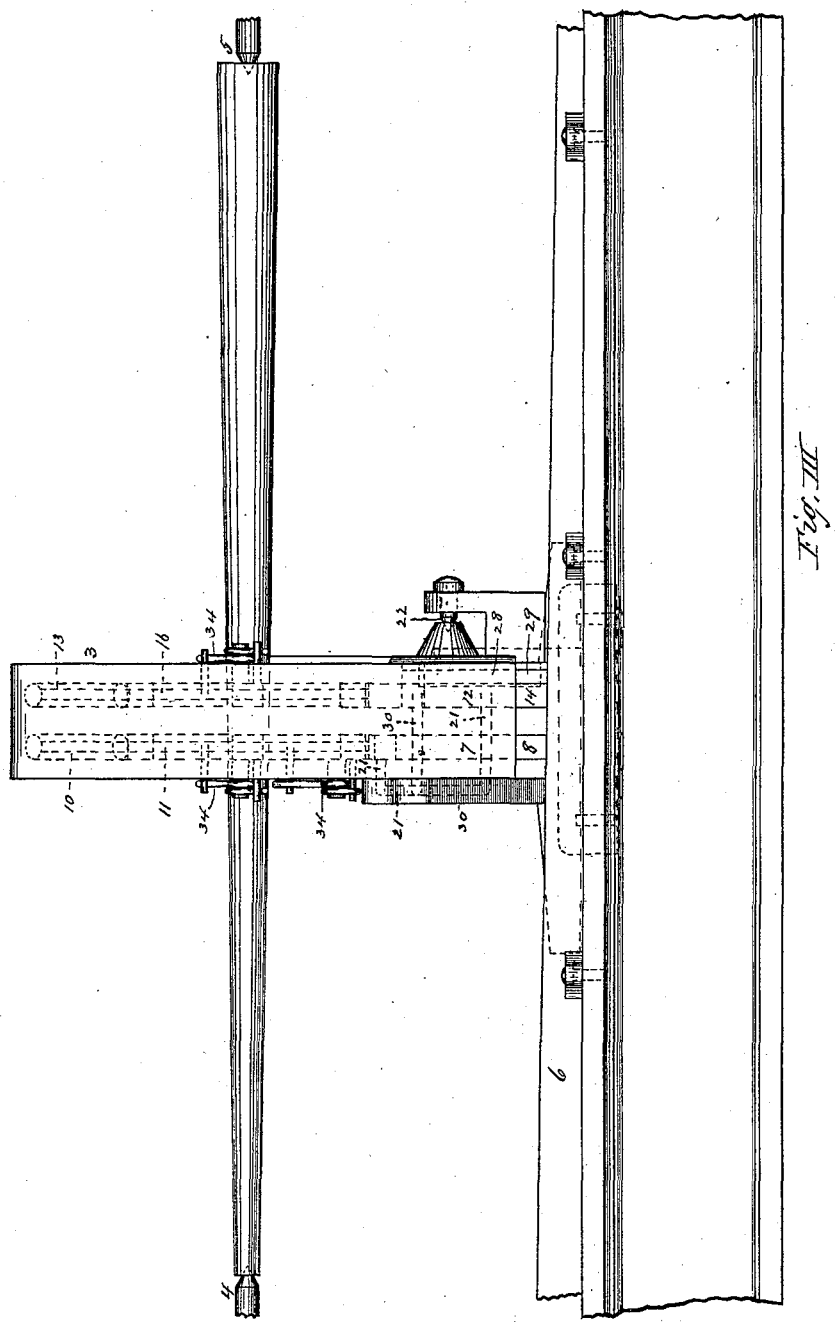

Fig. III.

Witnesses.
George D. Curtis
Chas. H. Wood.

Inventor.
Charles A. King,
By T. A. Curtis
his Atty.

(No Model.) 3 Sheets—Sheet 3.

C. A. KING.

MACHINE FOR TURNING GUN BARRELS AND OTHER ARTICLES OF IRREGULAR FORM.

No. 297,418. Patented Apr. 22, 1884.

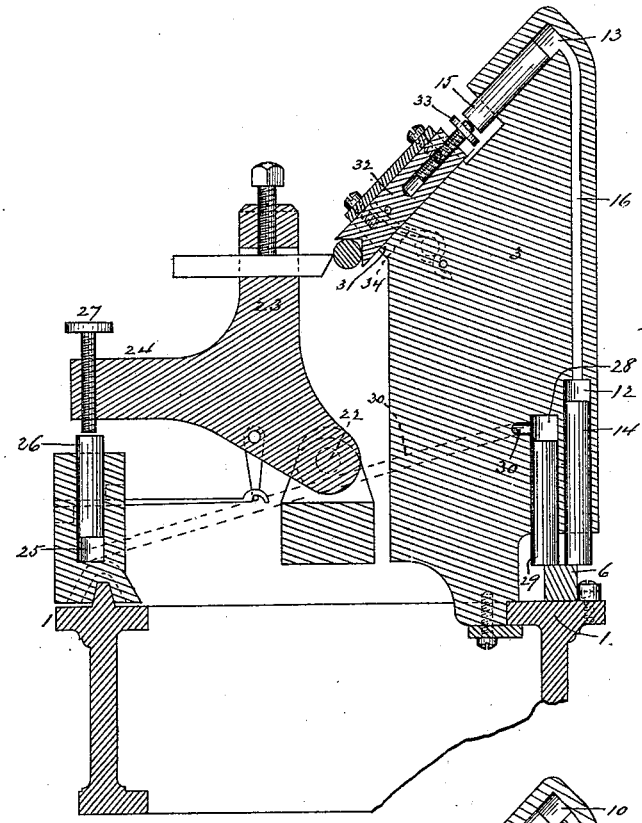

Fig. V

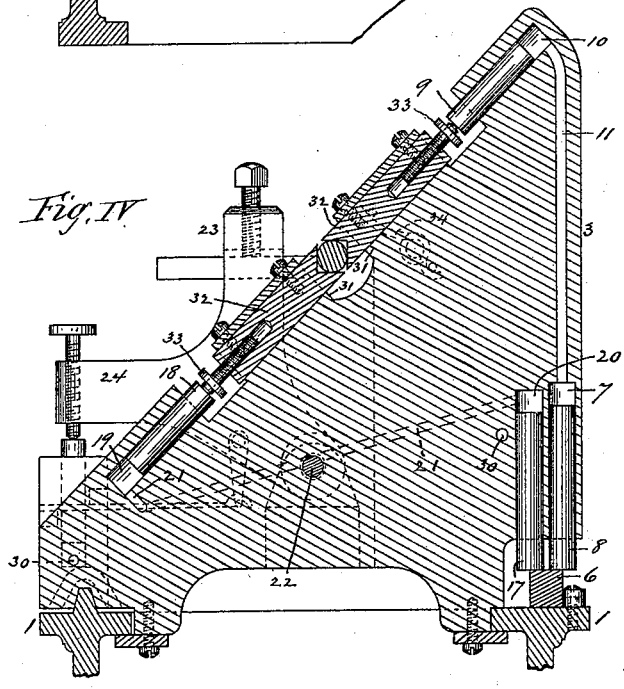

Fig. IV

Witnesses.
George O. Curtis
Chas. H. Wood.

Inventor:
Charles A. King
By T. A. Curtis
his Atty.

UNITED STATES PATENT OFFICE.

CHARLES A. KING, OF MERIDEN, CONNECTICUT.

MACHINE FOR TURNING GUN-BARRELS AND OTHER ARTICLES OF IRREGULAR FORM.

SPECIFICATION forming part of Letters Patent No. 297,418, dated April 22, 1884.

Application filed August 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. KING, of Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Machines for Turning Gun-Barrels and other Articles of Irregular Form, of which the following is a specification.

The object of my invention is to provide a machine for turning gun-barrels and other articles having an exterior tapered form, in which the cutting-tool and the movable rests which support the barrel or article near the cutting-tool, and which move with the latter, are all operated by a single former or guide, and through the medium of pistons or plungers, with an interposed liquid contained in chambers or passage-ways communicating therewith; and I accomplish this by the mechanism substantially as hereinafter described, and illustrated in the accompanying drawings, in which—

Figure I is a plan view of a machine for turning gun-barrels made according to my invention. Fig. II is an end view of the same. Fig. III is a rear view of the same. Fig. IV is a transverse vertical section at line A, showing the guide or former, the piston or plunger which moves along the same, and the barrel-rests and pistons which operate them. Fig. V is a transverse vertical section at line B, showing the guide or former, the piston or plunger which moves along the same to operate the piston immediately connected with the cutting-tool post or holder by which the latter is operated, and the duct or chamber which connects the cavities containing the said pistons shown in dotted lines.

In the drawings, 1 represents a supporting bed or frame provided with ordinary ways, upon and along which a carriage, 3, is adapted to be moved by means of the ordinary feed mechanism connected with the driving-gear in the usual construction of the common engine-lathes, which is well known. This bed is also provided with an ordinary head-block and tail-block, containing, respectively, the centers 4 and 5, between which the barrel is secured to be turned. To the top of this bed, and at the rear side, is secured a former or guide, 6, whose upper side has a horizontal profile corresponding to the taper which it is desired to turn the barrel, and the latter is secured in the lathe with its larger end toward the same end of the lathe as the depressions in the said former or guide. A hole is made in the carriage at 7, directly above the guide, into which is fitted snugly a piston, 8, but so as to move lengthwise, and another piston, 9, is fitted into a similar hole made at 10 in the carriage, and these two holes are connected by a duct, 11. If two back rests are to be used, two other similar holes are made at 12 and 13, containing each a similar piston, as 14 and 15, respectively, and these piston-holes are likewise connected by a duct or chamber, 16. For the purpose of greater accuracy, and to provide an efficient support in turning very thin barrels, I locate one of the back rests directly opposite a similar rest to be used on the front side of the machine to support the barrel, and the other back rest as nearly opposite the turning-tool on the front side as possible, so that this back rest may follow along the turned part of the barrel as nearly opposite the turning-tool as possible; and to this end I locate the piston 8 directly over the rear side of the former or guide, so that said piston may rest upon the upper side of the guide at the rear edge, and fit another piston, 17, into a similar hole or cavity, 20, directly in front of the piston 8, and over the front side of the former or guide, with another hole or cavity, 19, made in the front side of the carriage, into which is similarly fitted another piston, 18, and these two holes or cavities 19 and 20 are connected by a duct, 21.

The tool post or holder 23, I prefer to attach to the carriage so as to swing or move in the arc of a circle transversely across the machine, either upon centers at 22 or upon a rock-shaft hung at those points, and this tool post or holder I provide with a projecting arm, 24. I make a hole or cavity in the front part of the carriage, into which is fitted a piston, 26, directly beneath the projecting arm 24 of the tool-holder, and for the purpose of greater accuracy in adjustment I turn an adjusting-screw, 27, down a threaded hole in this arm, with its lower end bearing upon the top of the piston 26. In the rear side of the carriage, and directly above the guide 6 and at a point

directly opposite the piston 26, which operates the tool post or holder, I make another hole, 28, into which is fitted a piston, 29, and the holes 28 and 25 are also connected by a duct, 30.

Suitable guideways, 31, are made in the upper part of the carriage, into each of which is placed a rest, 32, fitted to slide lengthwise therein, and into a threaded hole made in the upper end of each rest I turn an adjusting-screw, 33, whose upper end is adapted to have a bearing against the piston above it. A similar guideway is made in the front part of the carriage with a similar rest, 32, fitted to slide therein, with an adjusting-screw, 33, turned into a threaded hole in its lower end, and its lower end adapted to bear against the upper end of the piston 18.

If desired, for convenience of keeping the rests all in place when not in use, a spring, 34, may be fitted to bear against each rest, to hold it and its adjusting-screw 33 against its piston.

To render the machine fitted for use, the ducts 41, 16, and 21, and 30 are entirely filled with any suitable liquid—glycerine being preferable, as being not liable to freeze—so that the entire space within the said ducts between the pistons in each two connected holes or cavities will be perfectly filled with the liquid, and the carriage 3 is moved to the end of the lathe with the pistons 8, 14, 17, and 29 bearing upon that end of the former or guide 6 which is highest, and the barrel to be turned is secured between the centers of the head and tail blocks of the lathe in the usual manner, with its smaller end between the front and back rests, or, if only a single back rest is used, between the cutting-tool in the tool-holder and the back rest, as shown clearly in the drawings.

The adjusting-screws 33 are adjusted so that the rests 32 will just have a bearing against that part of the barrel at the extreme end which has been turned off. In commencing to turn the barrel, and the machine being set in motion, as the work progresses the feed mechanism, which may be of any description in common use, moves the carriage 3 along its ways toward the other end of the machine. In this movement, the cutting-tool having been properly adjusted, the arm of the tool-holder, or the adjusting-screw therein, has a tendency to press down upon the piston 26, and force the latter against the glycerine or liquid within the duct 30, and this acts against the piston 29 to bear it down upon the upper side of the former or guide 6, causing the piston 29 to follow all the deviations from a true horizontal line on the upper side of said guide, and always keeping the cutting-point of the tool the proper distance from the axis of the barrel during the whole operation of turning the barrel. If the upper side of this former or guide 6 is depressed at one end, or gradually inclines downward as the carriage moves along during the progress of the work, it follows that the cutting-tool is allowed to gradually recede from the axis of the barrel to precisely the same extent that the former or guide is inclined, and thus the exact tapered form is given to the exterior of the barrel when finished.

If the rest 32, nearly opposite the cutting-tool on the back side of the carriage, is a little behind the cutting-tool in a direction lengthwise the barrel, so that the cutting-tool prepares a smooth surface on the barrel for the said rest to bear against, the piston 14 may be located in the carriage and over the former or guide a corresponding distance behind the piston 29 in the same direction. The said rest will be permitted to recede from the axis of the barrel and yet be in contact therewith by the action of the piston 14 along and upon the former or guide, and of the liquid within the duct 16, between the two pistons 14 and 15, and this rest 32 will have a very delicate and yet firm bearing against the barrel to support it while being turned, and will maintain its exact relative position with the cutting-tool to the axis of the barrel during the entire process of turning the latter when this position is once established. The other rests or supports 32 for the barrel, both front and back, which are quite near and just behind the cutting-tool in a direction lengthwise the machine, are limited and guided in their movement to adjust their bearing against the barrel while being turned, and as a support therefor, by the movement of their respective pistons 8 and 17 along and upon the former or guide 6, and by the liquid which fills the duct between the guide-piston and that against which each rest has a bearing in precisely the same manner in which the tool-holder and the rest nearly opposite the said holder are operated, as hereinbefore described.

In the manufacture of rifle-barrels, of course the latter do not require so much support while being turned, as the large proportion of stock in the barrel prevents any undue springing of the barrel while being turned; but in the manufacture of the finer qualities of shot-gun-barrels, where the latter require to be turned very thin, unless they are well supported during the process of turning, the pressure of the cutting-tool against them, even to a comparatively slight degree, will often bend the side of the barrel in and render it worthless, and this difficulty necessitates abundant support for the barrel, and this support must be accurate and delicate in its adjustment.

It is evident that the tool-holder, instead of being arranged to swing or move in the arc of a circle, might be arranged to slide toward and from the barrel either in a more or less inclined position or in a horizontal direction, in which case the piston 26 might be arranged or lie in a corresponding position behind the tool-holder, to control the position of the latter with reference to the axis of the barrel.

It is also evident that instead of making the

holes for the pistons, as well as the ducts, in the carriage itself, hollow cylinders may be properly located and secured to the carriage, and pipes attached to the outside of the carriage connecting the cylinders containing the pistons, which act together or in unison, without departing from the invention in the least.

If desired, the holes or cavities to contain the pistons may be of the same diameter as the ducts which communicate between or which connect them.

It is evident that any number of movable rests 32 may be used on a machine, either one or more, according to the quality of barrel being turned, the thinner and more delicate barrels requiring more rests to support them while being turned than those which are more rigid and stiff and contain a larger quantity of stock; and this invention is equally as applicable for use in turning any article of an irregular form, as in turning gun-barrels.

In a patent granted to me October 30, 1883, No. 287,548, I have shown and described a machine in which the tool-holder and rest are operated by means of sliding rack-bars and pinions, the said rack-bars being actuated by a former or guide corresponding with the former 6 in the present case. The operation of the tooth-holder and rest are the same in both cases, the only essential difference being that in the patented machine these parts are actuated by gearing, while in the present case they are actuated by hydraulic pressure.

Having thus described my invention, what I claim as new is—

1. In a machine for turning gun-barrels and other articles, a stationary former or guide secured to the bed of the machine, in combination with a carriage movable along said bed, a movable tool-holder secured on said carriage, a piston movable within a cavity in said carriage, and against which said tool-holder has a bearing, a piston movable within a cavity in said carriage and bearing against said former or guide, and a duct or chamber connecting said cavities and adapted to be filled with liquid, whereby the movement of the piston along said former or guide will actuate the tool-holder through the medium of the liquid, substantially as described.

2. In a machine for turning gun-barrels and other articles, a stationary former or guide secured to the bed of the machine, in combination with a carriage movable along said bed, a movable rest secured on said carriage, a piston movable within a cavity in said carriage against which said movable rest has a bearing, a piston movable within a cavity in said carriage, and having a bearing against said former or guide, and a duct or chamber connecting said cavities and adapted to be filled with liquid, whereby the movement of the piston against said former or guide will actuate said movable rest through the medium of the liquid, substantially as described.

3. In a machine for turning gun-barrels and other articles, a single stationary former or guide secured to the bed of the machine, a carriage movable along said bed, a movable tool-holder secured on the carriage, a piston movable within a cavity in said carriage against which the tool-holder has a bearing, a piston movable within a cavity in said carriage and having a bearing against said former or guide, and a duct or chamber connecting said cavities and adapted to be filled with liquid, in combination with a movable rest secured on said carriage, a piston movable within a cavity in said carriage, and against which said rest has a bearing to support a barrel or other article while being turned, a piston movable within a cavity in the carriage and having a bearing against said former or guide, and a duct or chamber connecting said cavities and adapted to be filled with liquid, whereby said tool-holder and said rest to support the barrel are operated in unison through the medium of the liquid in said ducts or chambers by their respective pistons moving against the same former or guide, substantially as described.

4. In a machine for turning gun-barrels and other articles, a stationary former or guide secured to the bed of the machine, a carriage movable along the bed of said machine, two rests movable on said carriage and located to support a gun-barrel or other article on opposite sides while being turned, a piston for each rest to bear against and movable within a cavity behind each rest, a piston to actuate each rest and movable within a cavity in the carriage and bearing against said former or guide, and a duct or chamber connecting each two cavities containing the pistons for each rest and adapted to be filled with liquid, whereby both said rests will be operated in unison by the movement of their respective pistons along the former or guide, through the medium of the liquid contained in their respective ducts or chambers, substantially as described.

5. In a machine for turning gun-barrels and other articles, a carriage movable along the bed of the machine, a movable rest secured on said carriage, and a piston movable within a cavity in said carriage, in combination with an adjusting-screw adapted to operate between said rest and said piston, for adjusting the pressure of the piston against the movable rest, substantially as described.

CHARLES A. KING.

Witnesses:
C. M. DOOLITTLE,
L. J. GAINES.