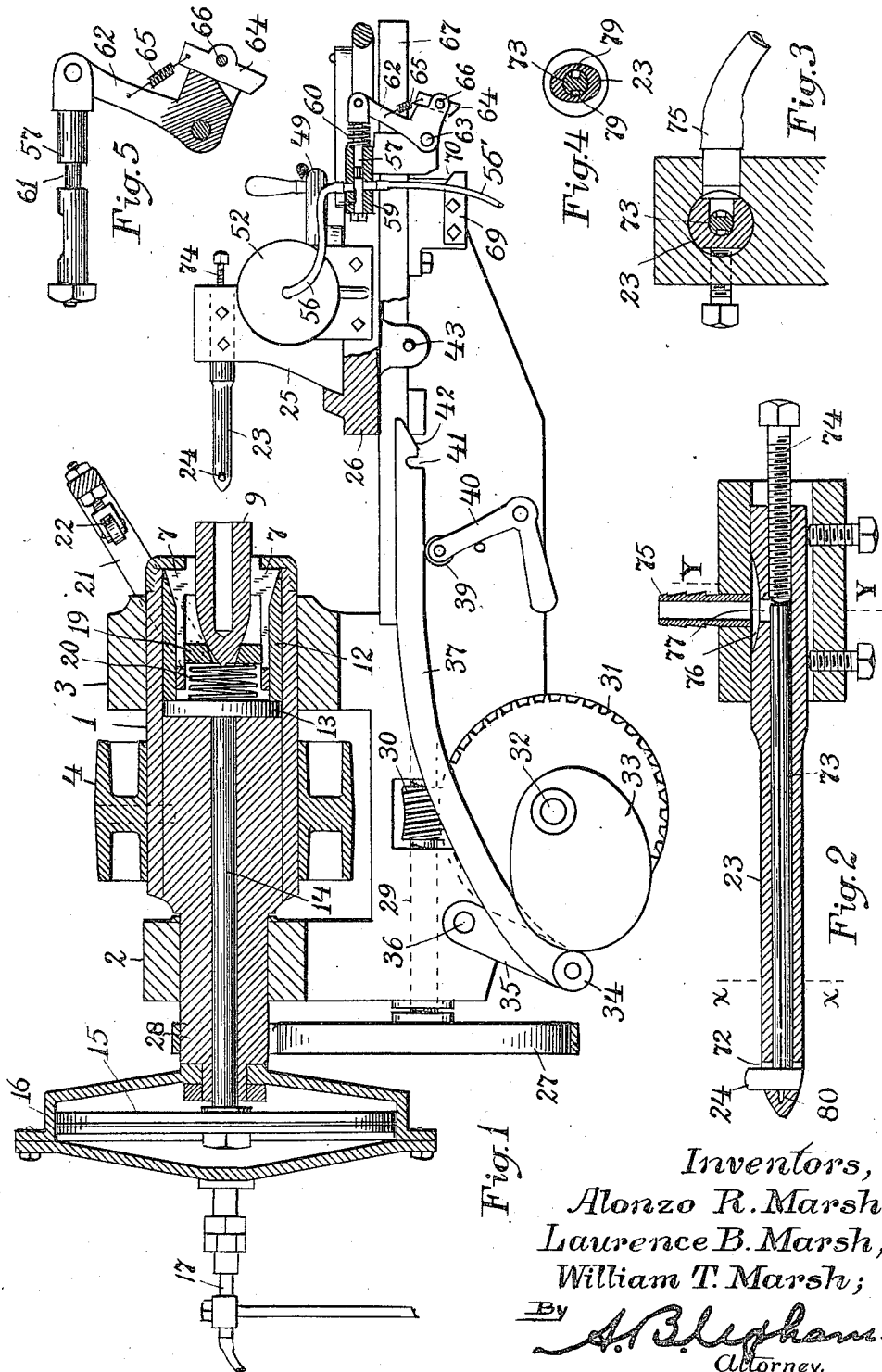


A. R., L. B. AND W. T. MARSH.
LATHE.
APPLICATION FILED MAR. 18, 1918.

1,320,162.

Patented Oct. 28, 1919.

2 SHEETS—SHEET 1.



Inventors,
Alonzo R. Marsh,
Laurence B. Marsh,
William T. Marsh;
By *A. B. Stephens.*
Attorney.

APPLICATION FILED MAR. 18, 1918.

Patented Oct. 28, 1919.

2 SHEETS—SHEET 2.

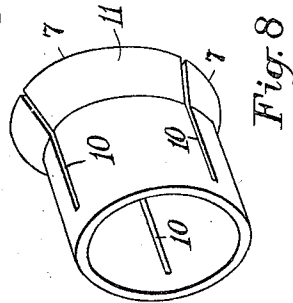


Fig. 8

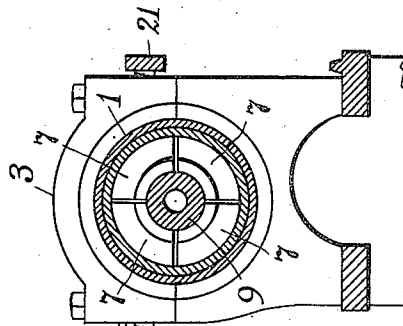


Fig. 7

 *Inventors,*
Alonzo R. Marsh,
Laurence B. Marsh,
William T. Marsh;
By *A. B. Blusham.*
Attorney.

UNITED STATES PATENT OFFICE.

ALONZO B. MARSH, LAURENCE B. MARSH, AND WILLIAM T. MARSH, OF BROCKTON,
MASSACHUSETTS, ASSIGNORS TO STERLING MOTOR CAR CO., OF BROCKTON,
MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LATHE.

1,320,162.

Specification of Letters Patent.

Patented Oct. 28, 1919.

Application filed March 18, 1918. Serial No. 223,072.

To all whom it may concern:

Be it known that we, ALONZO B. MARSH, LAURENCE B. MARSH, and WILLIAM T. MARSH, all citizens of the United States, and residents of Brockton, in the county of Plymouth and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Lathes, of which the following is a full, clear, and exact specification.

This invention has for its object the effecting of the hereinafter described improvements in machines for turning the interiors of hollow objects, such as explosive shells.

In the drawings forming part of this specification, Figure 1 is a vertical longitudinal section of a lathe embodying the improvements. Fig. 2 is a longitudinal section nearly full size, of the cutting tool. Fig. 3 is a cross section through the line Y-Y in Fig. 2. Fig. 4 is a cross section on the line X-X in Fig. 2. Fig. 5 is a detail view of a part of the air control device. Fig. 6 is a plan view of the lathe. Fig. 7 is a cross section through the line Z-Z in Fig. 6. Fig. 8 is a perspective view of the principal member of the shell-receiving chuck.

An enlarged spindle 1 rotatable in bearings 2 and 3 actuated by power belted to the pulley 4, is formed with a hollow head 5 partially closed by an annular cap 6. Within the head and kept in place by the cap 6, are the spring jaws 7 for gripping the shells 9 while being internally finished. These jaws are preferably formed integral but split apart for a portion of their length, as at 10 in Fig. 8. Each jaw is formed with a conical outer periphery 11 engaged by a correspondingly shaped ring 12 adapted to be pressed against the wedged periphery 11 by a disk 13, the latter being moved by a rod 14 slidable in the spindle 1 and connected with a plunger 15 in the cylinder 16. Compressed air being admitted behind the plunger through a tube 17, the ring 12 wedges the jaws inward and thereby firmly clamps the shell in place. When the air is shut off from the cylinder 16, the resilience of the jaws aided by the spring 20 forces the ring, rod and plunger back, and the jaws to expand.

Within the circle of the inner ends of the spring jaws 7 is a loosely fitting annulus 19, and a helical spring 20 between the annulus and the disk 13, for centering the pointed

inner end of the shell 9. To accurately locate the outer end of the shell, a yoke 21 is pivoted to the sides of the bearing 3 and provided with an adjustable anti-friction roll 22. A shell being pushed in between the jaws against the pressure of the annulus 19 until the roll 22 is lowered with the yoke in front of the upper part of the end of the shell, the air is switched into the cylinder 16 and the machine set in motion. The roll 22 being rotatable, wear between the same and the shell is prevented.

The cutting tool comprises a slender rod 23 bearing a bit of tool steel 24, as shown in Fig. 2, this rod being carried by a slide rest 25 transversely movable on the carriage 26. For feeding the tool longitudinally within the shell, a pulley 27 is suitably belted to the spindle 1 at 28, the shaft 29 of the pulley being provided with a worm 30 meshing with a worm wheel 31. On the shaft 32 of this worm wheel is a cam 33 bearing against a friction roll 34 supported by a link 35 pivotally supported at 36. From the lower end of this link a curved bar 37 reaches toward the carriage 26, being normally supported on the anti-friction roll 39 of the lever 40. At the extremity, this bar is given a deep notch 41 and an inclined end surface 42, the notch being designed for engagement with a pin 43 connected with the carriage 26, so that as the bar 37 is reciprocated through the action of the cam 31, and of a weighted cord or chain passing over a pulley in a well known manner and attached to the carriage, the carriage can be moved toward and from the work. Such engagement is obtained simply by moving the carriage by means of the hand lever 44 toward the work until the inclined surface 42 slides up over the pin 43 and the notch drops onto the latter. For disengaging the feeder bar from the carriage, the lever 40 is swung up to a vertical position, thereby raising the feeder bar away from its engagement with the pin.

As shown in Fig. 6, the cutting tool 24 projects from the back of the rod 23 and performs its function when the spindle 1 is revolving in a reverse direction compared with other lathes. Hence after the tool has been inserted in the hole 45 drilled into the shell 9, illustrated in Fig. 1, for a distance of an inch or thereabout to avoid the section which is to be internally threaded, the tool rest 25

is pressed away from the operator while the tool 24 is cutting its way toward the blind end of the hole. On the return stroke of the carriage, the tool may cut another chip, and so on with each reciprocation thereof.

To control the depth to which the tool cuts, a form 46 is rigidly supported at the back of the lathe bed, as shown in Fig. 6, against which a follower 47 held by the tool rest 25, comes in contact and so shapes the recess within the shell.

For yieldingly pressing the follower against the form, we prefer to use compressed air, employed in the following manner: Attached to the carriage is a cylinder 52 having a plunger 53 joined by a rod 54 to an ear 55 rising from the tool rest 25. Air being admitted behind the plunger, the tool rest and tool are forced toward the form 46 in the desired way. The compressed air is admitted to the plunger through tubes 56, 56' controlled by a valve 57 shown in Figs. 1 and 5.

The valve 57 is automatically controlled by means of a bell-crank lever 62 pivotally supported at 63 by the carriage 26, and provided with a dog 64 held by a spring 65 in the position shown in Fig. 5, the dog being pivoted to the short arm of the bell-crank lever at 66, and the latter being cut away to permit the dog to swing at its lower end toward the spindle 1. Carried by the lathe bed 67 is a block 69 whose edge 70 is somewhat chamfered.

When the carriage is drawn toward the spindle, and just when the tool 24 reaches the proper point within the shell 9, the dog 64 rides up onto the block 69 and swings the lever 66 over, opening the valve 57 and thereby admitting the compressed air to the cylinder 52, and pressing the cutting tool 24 into action. This action continues until the dog 64 reaches the farther end of the block 69, drops down beyond it, allows the lever 66 to swing back, the valve closes, the compressed air is shut off from the cylinder, and the tension spring 71 (Fig. 6) draws the tool rest forward and the tool 24 out of cutting action.

In order to prevent the chips cut by the tool point 24 from accumulating within the shell being internally turned, the rod 23 is made tubular, as shown in Fig. 2, in order that a blast of air can be forced through it for blowing the chips out from within the shell. The tool point 24 is located in a hole 72 disposed transversely near the extremity of the rod 23, and the tool point clamped therein by means of a spindle 73 within the rod, and a set screw 74 tapped in the butt end of the rod and setting against the spindle.

The air blast is admitted through a nipple 75 from a suitable source, passing from the nipple to a recess 76 and a hole 77 in

the butt of the rod 23 opening into the interior of the latter. The spindle 73 being formed with one or more longitudinal grooves 79, the air traverses the same until the tool point is reached, where some jets from the hole 72 but the larger part of the air issues from the eye 80 at the point of the rod 23, and thereby ejects from within the shell every particle of chip and dust as fast as cut.

As shown in Fig. 4, the rod 23 is made elliptical in cross section, with the major axis vertical, in order to permit the same to be of maximum strength and still capable of sufficient lateral movement within the restricted interior of the shell.

The general operation of the machine is as follows: The carriage being disconnected from the reciprocating bar 37 and run back a short distance, a shell is introduced within the spring jaws 7, the yoke 21 swung down until its roll 22 is in front of the shell, the spring 20 pressing the latter snugly against the roll, then compressed air is switched into the cylinder 16 to actuate the spring jaws, the yoke is swung up and out of the way, the carriage 26 is brought forward until its pin 43 engages the notch 41, after which the carriage continues moving back and forth and the tool point 24 pressed into and out of engagement until the shell is completely hollowed out. Then the reciprocating bar 37 is disengaged from the pin 43, the carriage 26 is moved back, the shell 9 removed, after the air is shut off from the cylinder 16, another shell introduced, the yoke swung down, and the operation continued as before.

What we claim is:

1. A lathe comprising a rotatable spindle having gripping jaws for clamping between them an article to be turned, such article being elongated and having a reduced inner end, a member slidable in the direction of the axis of the spindle and having a centrally located opening for receiving the reduced end of the article, and resilient means for pressing said member into engagement with the article and thereby centering its inner end.

2. A lathe comprising a rotatable spindle having gripping jaws for clamping between them an article to be turned, means operative at will for actuating said jaws, resilient means pressing against the inner end of the article, and a yoke pivotally supported to be brought down in front of the end of the article for accurately locating it in the axis of the spindle.

3. A lathe comprising a spindle having gripping jaws for clamping between them an article to be turned, bearings for said spindle, means for yieldingly pressing the article outward, a yoke pivoted to one of the bearings and adapted to be swung down in

front of the end of the article, and an adjustable anti-friction roll carried by the yoke to perform the function of a stop.

4. A lathe comprising a spindle having a
5 hollow head, resiliently supported clamping jaws in said head having inclined outer periphery, an annulus coacting with said inclined periphery for forcing the jaws into clamping engagement with an article to be
10 turned, a disk engaging said annulus, a rod abutting against said disk axially of the spindle, a cylinder carried by said spindle, a plunger within said cylinder connected

with said rod, and means for admitting compressed air into said cylinder for actuating 15 said rod, disk, annulus and clamping jaws.

In testimony that we claim the foregoing invention, we have hereunto set our hands this 4th day of March, 1918.

ALONZO R. MARSH.
LAURENCE B. MARSH.
WILLIAM T. MARSH.

Witnesses:

F. M. GIBSON,
E. MARION MILES.