(No Model.)

4 Sheets—Sheet 1.

S. A. PENNY.

LATHE.

No. 398,077. Patented Feb. 19, 1889.

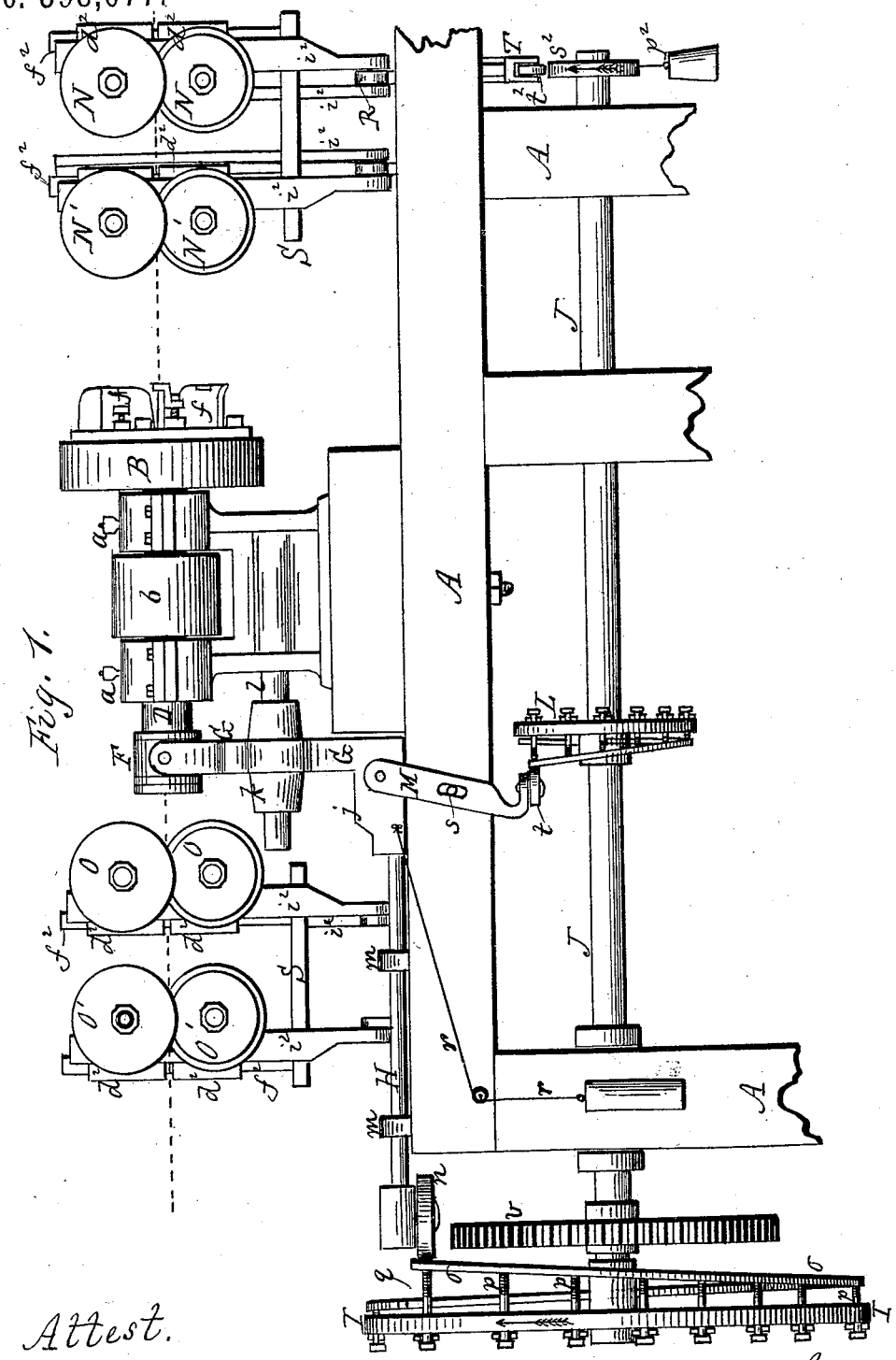


Fig. 1.

Attest.

C. H. Plumb
John H. Hopkins

Inventor.
Sanford A. Penny,
per R. F. Osgood,
Atty.

(No Model.) 4 Sheets—Sheet 2.

S. A. PENNY.

LATHE.

No. 398,077. Patented Feb. 19, 1889.

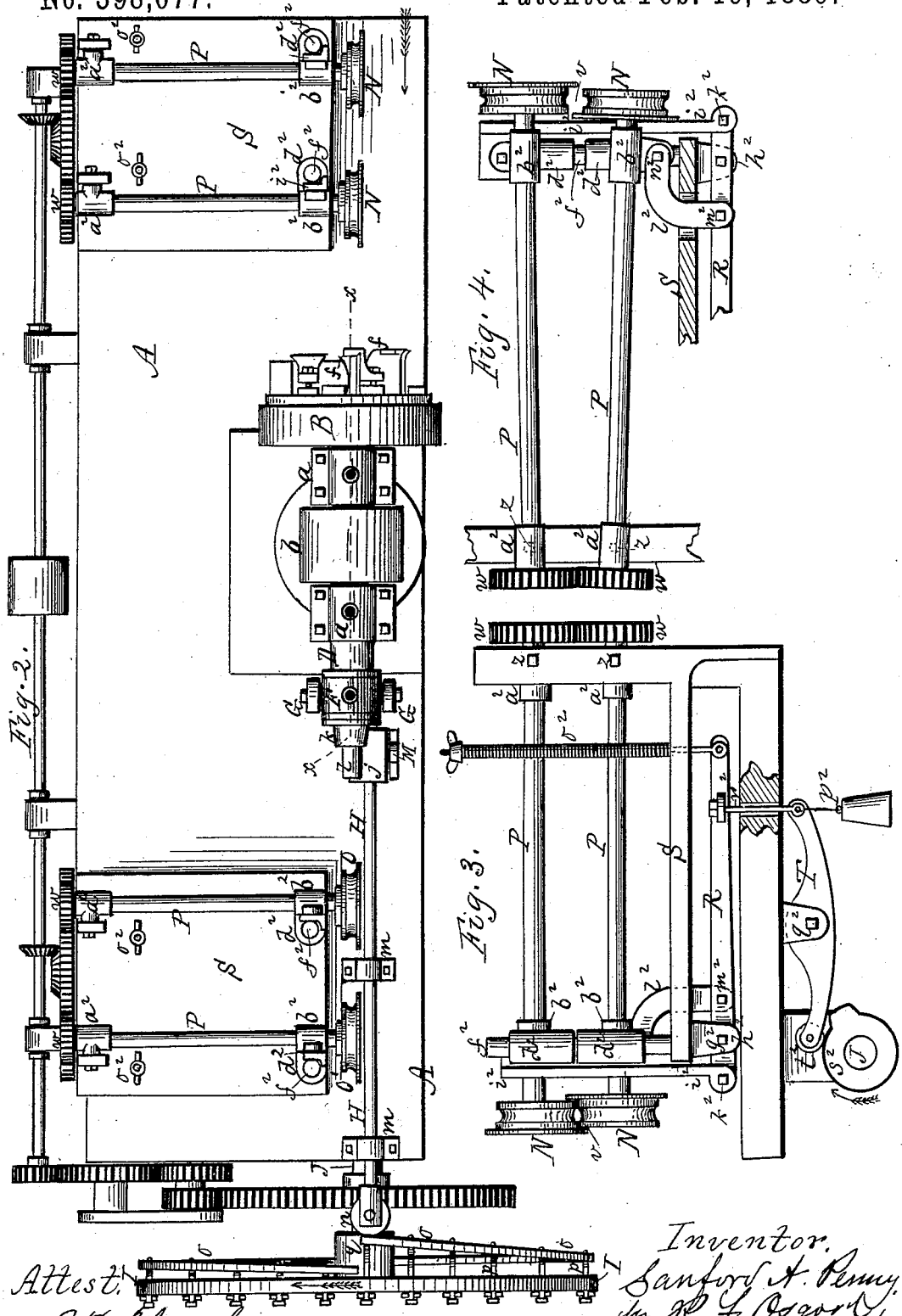


Fig. 2.

Fig. 4.

Fig. 3.

Attest:
C. C. Burns
John A. Hopkins

Inventor.
Sanford A. Penny.
by R. F. Osgood.
Atty

(No Model.) 4 Sheets—Sheet 3.

S. A. PENNY.

LATHE.

No. 398,077. Patented Feb. 19, 1889.

Fig. 5.

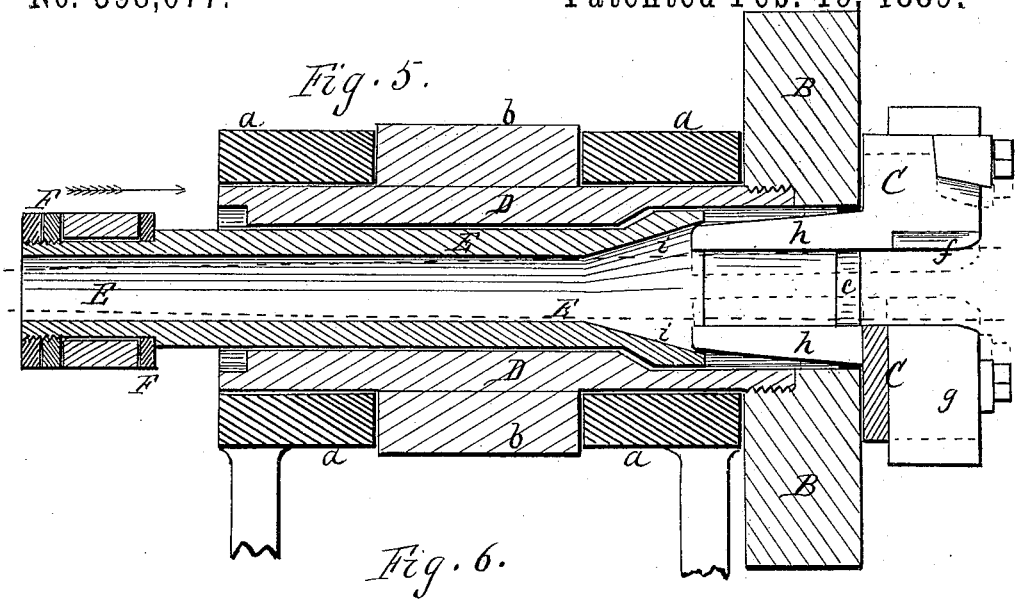


Fig. 6.

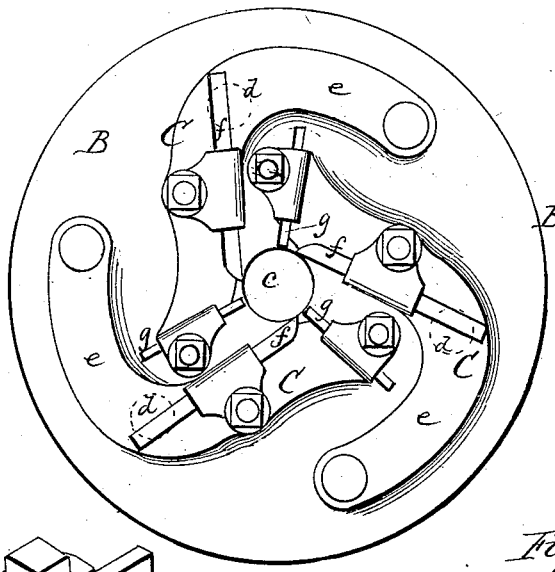


Fig. 7.

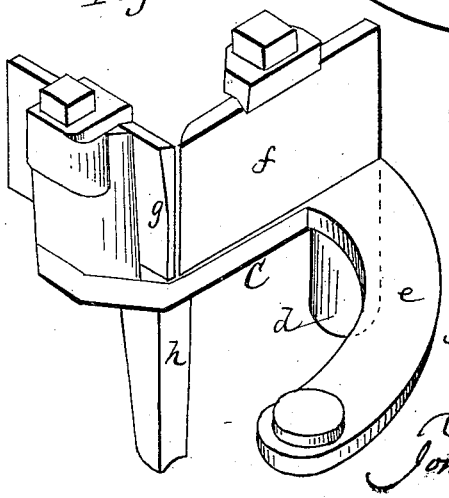


Fig. 8.

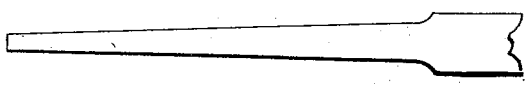
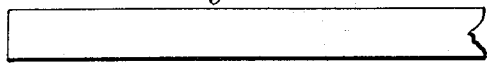


Fig. 9.



Attest.

C. W. Blunt
John H. Hopkins

Inventor.

Sanford A. Penny.
per R. F. Osgood
Atty

(No Model.) 4 Sheets—Sheet 4.

S. A. PENNY.

LATHE.

No. 398,077. Patented Feb. 19, 1889.

Fig. 10.

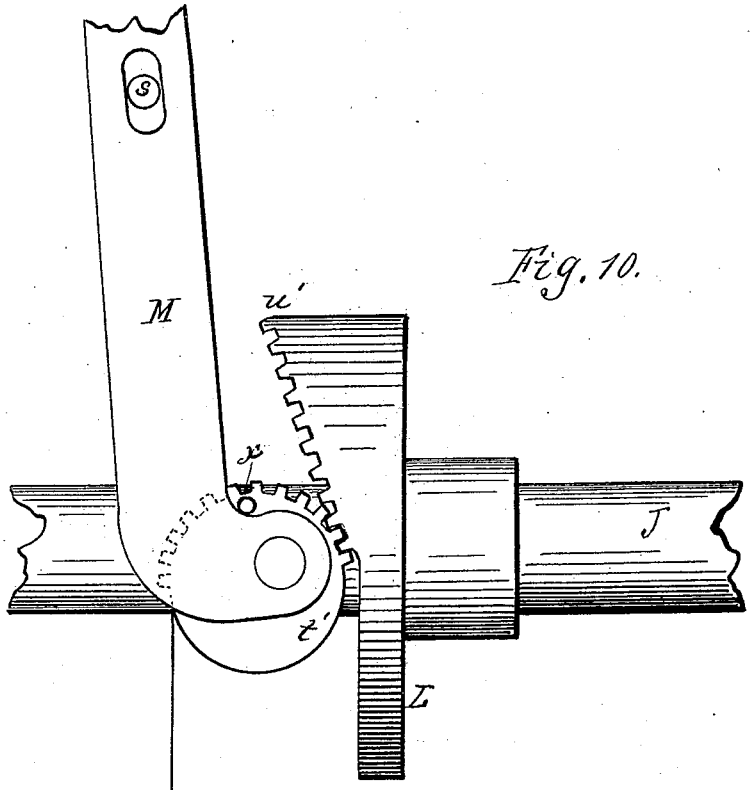
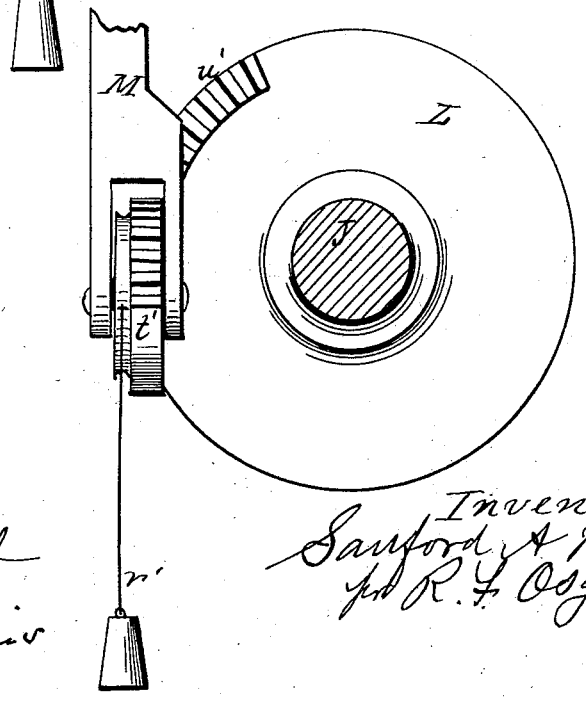


Fig. 11.



Attest.
C. H. Blunt
John H. Hopkins

Inventor.
Sanford A. Penny.
by R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE.

SANFORD A. PENNY, OF ROCHESTER, NEW YORK.

LATHE.

SPECIFICATION forming part of Letters Patent No. 398,077, dated February 19, 1889.

Application filed August 17, 1888. Serial No. 283,048. (No model.)

To all whom it may concern:

Be it known that I, SANFORD A. PENNY, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Lathes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this application.

My improvement relates to that class of wood-turning lathes in which a hollow head provided with cutters is used, and the stick passes through the same for the purpose of being turned in either tapering or cylindrical form.

The invention consists in the construction and arrangement of parts hereinafter described and definitely claimed.

In the drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a top plan view. Fig. 3 is an end elevation looking in the direction of the arrow at the right in Fig. 2 and showing the feeding-rollers closed to prevent the admission of the stick to be turned. Fig. 4 is an elevation of the upper portion of Fig. 3, looking on the opposite side and showing the feeding-rollers opened to admit the stick. Fig. 5 is an enlarged central vertical section of the cutter-head and its operating parts in line *x x* of Fig. 2 and showing the knives opened to their fullest extent. Fig. 6 is an enlarged end view of the cutter-head and its knives. Fig. 7 is a perspective view of one of the knife-stocks, its knife, and gage. Figs. 8 and 9 are diagrams exhibiting different forms of the turned stick. Figs. 10 and 11 are an elevation and cross-section showing modifications of the devices for shifting the plunger on the operating-cam.

A indicates the frame of the machine, which may be of any desired form and construction.

B is the cutter-head, which is mounted to turn in bearings *a a*, and is operated by a pulley, *b*, or any other desired means. This cutter-head has a central hole, *c*, Fig. 6, through which the stick is fed to be turned. It also has on its face cutter-stocks C C, pivoted at *d d* to the cutter-head, and carrying knives *f f* and gages *g g*, which center to the hole *c*. The knives stand at a tangent to the opening; but the gages, which consist of blunt-ended blades, stand radially, or nearly so, and by resting against the sides of the stick prevent the knives cutting too deep. They both swing with the knife-stock around the pivot *d*, (shown in dotted lines, Fig. 6,) and therefore always preserve the same relative position. The knife-stocks are each provided with a counterbalance-arm, *e*, which lies flat on the face of the cutter-head and serves to balance the stock and keep it in proper position under rapid rotation. Each of the knife-stocks also has on the inner side a right-angled guide-arm, *h*, Figs. 5 and 7, which extends into the opening *c* and bears against the turned sides of the stick.

D is a hollow shaft to which the cutter-head B is permanently attached, said shaft turning in the bearings *a a*.

E is a hollow mandrel resting inside the hollow shaft and being capable of longitudinal movement. The mouth of this mandrel has a beveled or inclined throat, *i*, Fig. 5, in which the ends of the guide-arms *h h* rest. When said mandrel is pushed forward, it forces the guide-arms *h h* toward each other, consequently closing the knives to their work against the stick. When said mandrel is drawn back, the knives throw out by centrifugal action.

F is a swivel-head on the rear end of the mandrel E, and G is a forked arm pivoted thereto, extending downward, and provided at the bottom with a slide, *j*, that slides forward and back on the main frame. The arm G also has an intermediate hub, *k*, that slides on a short spindle, *l*, that forms a guide.

H is a plunger-rod attached to slide *j*, extending through bearings *m m*, and provided at its outer end with a friction-roller, *n*, Figs. 1 and 2.

I is a cam-wheel on a shaft, J, and *o* is a cam on the inner face of the wheel, said cam consisting of a yielding strap of steel, which is adjusted out and in to give more or less throw by means of adjusting-screws *p p*, which pass through the wheel. This strap rests in spiral form, and at the open ends forms a jog, *q*. The friction-roller *n* bears against the cam, and is operated by it to throw the mandrel E forward by means of the plunger and other connecting parts before described.

The back-stroke of the mandrel is produced

by a weighted cord, *r*, Fig. 1, attached to the slide *j*, or by any other suitable means.

L is another cam-wheel on shaft J, and M is a lever pivoted at one end to the slide *j* and to the main frame at *s*, which acts as the fulcrum, the lower end of said lever being provided with a friction-roller, *t*, that bears against the cam-wheel. The object of this arrangement is to lift the friction-roller *n* of the plunger H from its inner to its outer bearing on the cam *o* at the jog *q*. The cam-wheel I turns in the direction indicated by the arrow thereon in Figs. 1 and 2. In starting the roller *n* rests against the offset or outermost projection of the cam *o* and gradually runs inward as the cam-wheel turns. At the end of the revolution said friction-roller *n* has to be lifted bodily or thrown out onto the offset again. This is accomplished by the cam-wheel L and lever M, above described.

Figs. 10 and 11 show a modified arrangement for shifting the plunger, consisting of an eccentric mutilated gear, *l'*, on the end of the lever M and a cam-shaped cog-segment, *n'*, on the cam-wheel L. When the gears engage, the lever is thrown by the double action of the cam and the eccentric. A weighted cord, *r'*, winds on the eccentric to produce the necessary reaction, and a stop, *x*, on the eccentric strikes the lever to prevent the eccentric from being thrown too far back.

N N and N' N' indicate feeding-rollers on the feeding end, and O O and O' O' similar rollers on the discharge end of the machine. The rims are grooved, as shown at *v v*, to receive the stick to be turned, and these grooves stand in axial line with the center hole, *c*, of the cutter-head. P P' are the shafts to which said rollers are attached, and *w w* are the gears for imparting rotary motion thereto. The rollers are capable of separating to a certain degree to allow the entrance and passage of the stick; but this opening movement has to be timed with the motion of the machine, so as to commence the cutting at the proper time. At all other times the primary rollers N N are closed together, as shown in Fig. 3, so that the stick cannot enter.

To produce the proper automatic action, the following arrangement is employed: The boxes a^2 a^2, that support the ends of the shafts P P farthest from the feed-rollers, are pivoted to the frame at *z z*, Figs. 3 and 4, so as to turn with the spread of the rollers. The boxes b^2 b^2 at the opposite ends next to the rollers are pivoted to sockets d^2 d^2, that slide freely up and down on the fixed spindles f^2 f^2.

R is a lever pivoted at g^2 to a fixed lug, h^2, of the frame S, that supports the rollers and shafts.

i^2 is a link pivoted at k^2 to the outer short end of lever R, said link extending up to the top and having the upper box b^2 pivoted thereto.

l^2 is a curved link pivoted at m^2 to the long end of lever R inside the fulcrum, and having the lower box b^2 pivoted to it at n^2.

o^2 is a spring-rod connected with the long end of lever R, which tends to throw said long end up, and p^2 is a weight hung to the long end of lever R, which tends to draw it down.

T is a rock-lever under the table, pivoted at q^2.

r^2 is a link connecting one end of lever T with the long end of lever R.

s^2 is a cam-wheel, which acts against a roller, l^2, on lever I to throw said lever up. At the proper moment cam s^2 will trip lever T, drawing down the long end of lever R, and consequently spreading the rollers N N, through the medium of the links i^2 l^2, which are pivoted to the boxes supporting the shafts of the rollers. The movement of cam s^2 is timed so as to open the feed-rollers at the proper moment.

This machine is adapted to turning either tapering or straight forms. In turning tapering forms the tip is first entered into the cutter, and the cut is gradually enlarged to the butt. In this case the roller *n* gradually follows down the cam *o*, and the mandrel E recedes, allowing the knives to open, as before described. At the end of the revolution of the cam the stick has passed through, and at that moment the roller *n* is shifted to the outer side of the cam-offset at *q*, and at the same time the feed-rollers N N are opened to admit another stick. The machine is particularly effective in turning tapering whip-stocks. To turn a straight or cylindrical form, the cam-wheel is disengaged and remains stationary at any given point, and the stick is run through without movement of the mandrel. The size is gaged by setting the cam or mandrel at any given position to hold on the guide-arms *h h*. The cam is stopped by simply using an engaging and disengaging gear of any suitable kind connected with the gear-wheel V on shaft J.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lathe, the combination, with a cutter-head provided with a central hole for the passage of the article to be turned, of a set of knife-stocks pivoted to the face of the cutter-head and provided with guide-arms that extend inward through the hole and are operated upon by a mandrel to close the cutters to their work, as set forth.

2. In a lathe, the combination, with a cutter-head provided with a central hole for the passage of the article to be turned, of a set of knife-stocks pivoted to the head, a set of knives attached to said stocks and standing tangentially to the opening, and a set of gages attached to said stocks standing radially to the hole, as and for the purpose specified.

3. In a lathe, the combination of a cutter-head provided with a center hole, a set of knife-stocks carrying knives pivoted to said head and provided with guide-arms that extend into the hole, and a mandrel provided with a beveled end against which the guide-

arms rest and by which they are operated, as herein shown and described.

4. The combination of the cutter-head B, mounted on a shaft and provided with the central hole, *c*, the set of knife-stocks C C, pivoted to the head and provided with the guide-arms *h h*, extending into the hole, the sliding mandrel E, provided with a beveled end that engages with the guide-arms, the lever G, connecting with the mandrel, the plunger H, connected with the lever, the cam *o*, for giving motion to the plunger, and the weighted cord *r*, for producing reaction on the lever, all operating in the manner and for the purpose specified.

5. In a lathe, the combination of the cutter-head provided with a central hole, a set of knife-stocks carrying knives and provided with guide-arms and pivoted to said cutter-head, a mandrel with a beveled end connecting with the guide-arms for operating the same, and feed-rollers for feeding the article to be turned through the cutter-head, as herein shown and described.

6. In a lathe, the combination of the grooved feeding-rollers N N, their shafts P P, boxes a^2 a^2, pivoted to their supports to allow the shafts to spread, the spindle f^2, sockets d^2 d^2, resting and sliding thereon, and the boxes b^2 b^2, pivoted to said sockets, as shown and described, and for the purpose specified.

7. In a lathe, the combination, with the shafts P P, carrying feed-rollers N N, of the spindle f^2, the sockets d^2 d^2, sliding thereon, the boxes b^2 b^2, pivoted to said sockets and supporting the shafts, the lever R, the link i^2, connecting the said lever with the upper box, and the link l^2, connecting said lever with the lower box, as shown and described, and for the purpose specified.

8. The combination, with the shafts P P, carrying feed-rollers N N, of the spindle f^2, the sockets d^2 d^2, sliding thereon, the boxes b^2 b^2, pivoted to said sockets, the lever R, the links i^2 and l^2, connecting said lever with the sockets, the lever T, connected with the lever R by link r^2, the cam s^2, and the reacting spring-rod o^2, as and for the purpose specified.

9. In a lathe, the combination, with the slide *j*, plunger H, and cam *o*, of the lever M, pivoted to the slide, the cam L, for operating the lever, and the weighted cord *r*, for producing reaction of the slide, as shown and described, and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SANFORD A. PENNY.

Witnesses:
R. F. OSGOOD,
P. A. COSTICH.