

(No Model.)

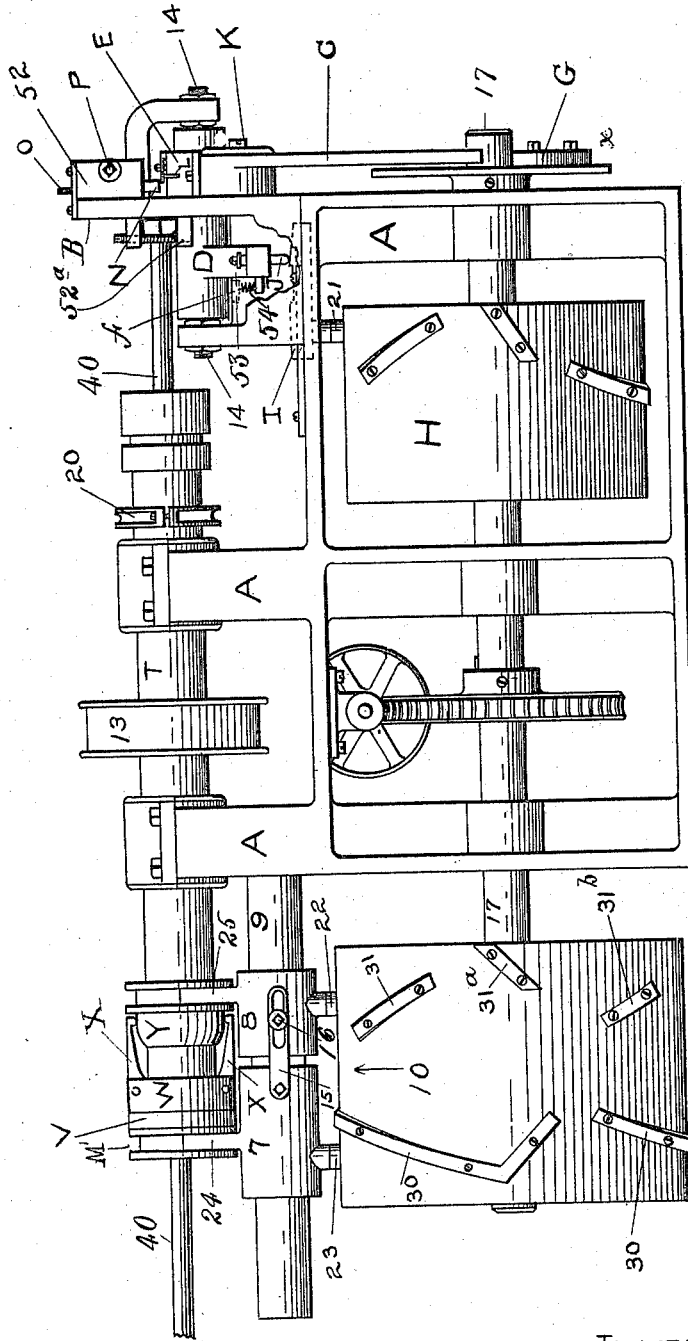
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F. E. & F. O. WELLS.
AUTOMATIC TURNING LATHE.

No. 580,354.

Patented Apr. 6, 1897.

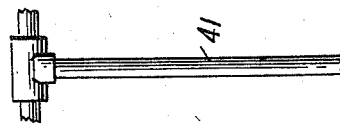
FIG. 1.



WITNESSES

H. S. Clemens

Chas. Brooks



By

INVENTORS,
*Frederic E. Wells, and
Frank O. Wells.*

Chapin

ATTY'S.

(No Model.)

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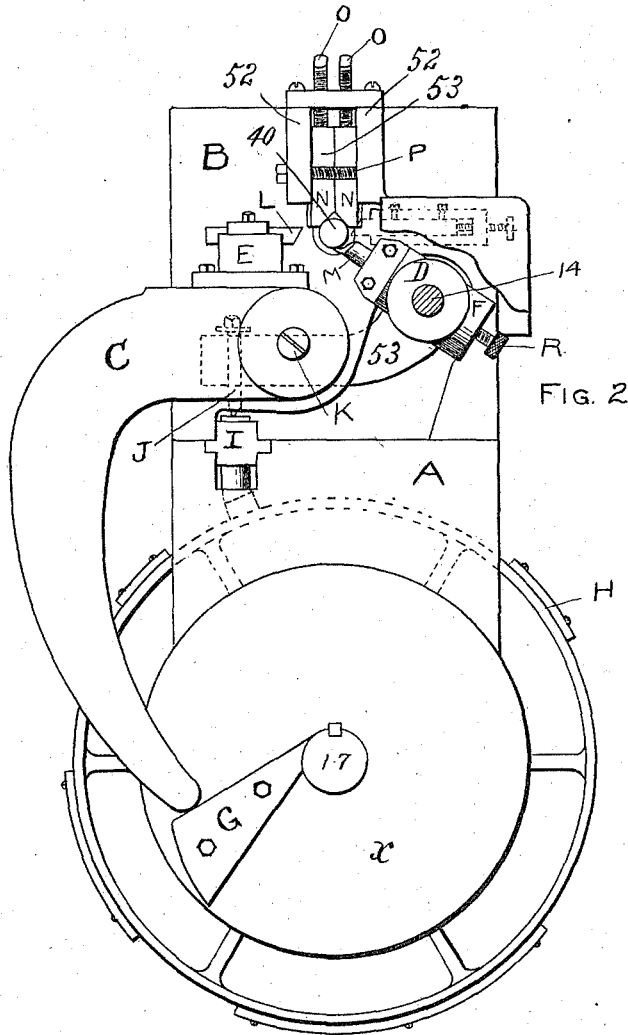


FIG. 2

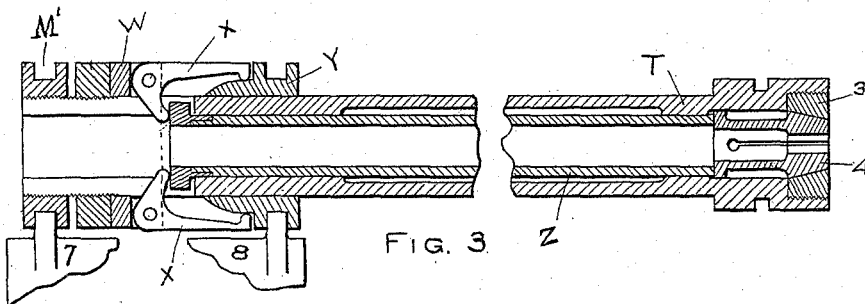


FIG. 3

WITNESSES
H. S. Clemons
Chas B. Cook

INVENTORS
Frederic E. Wells, and
Frank O Wells.
 By *Chapman &*
 ATTY'S.

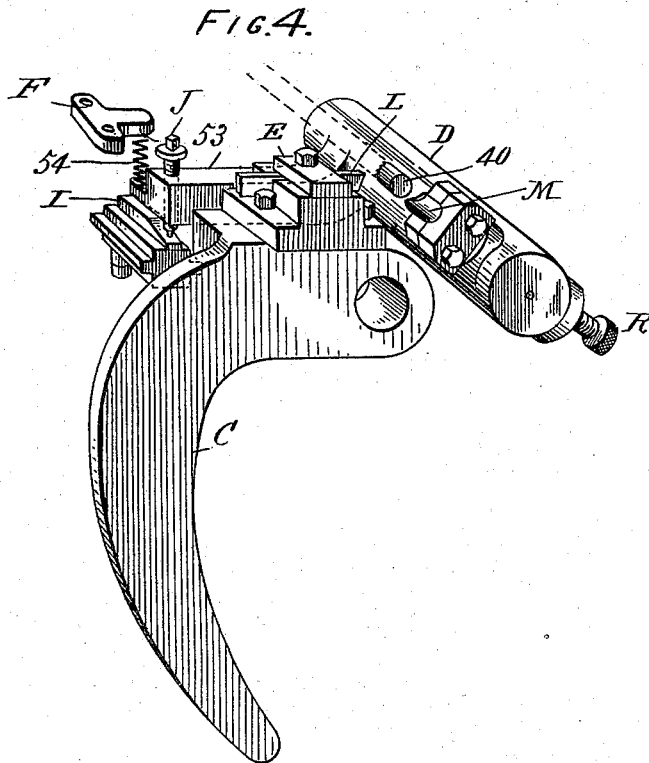
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F. E. & F. O. WELLS.
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WITNESSES
H. S. Clemons
Chas B. Keeler

INVENTORS
Frederic E. Wells, and
Frank O. Wells,
BY *Chapin*
ATTY'S.

UNITED STATES PATENT OFFICE.

FREDERIC E. WELLS AND FRANK O. WELLS, OF GREENFIELD, MASSACHUSETTS, ASSIGNORS TO WELLS BROTHERS & CO., OF SAME PLACE.

AUTOMATIC TURNING-LATHE.

SPECIFICATION forming part of Letters Patent No. 580,354, dated April 6, 1897.

Application filed August 14, 1896. Serial No. 602,754. (No model.)

To all whom it may concern:

Be it known that we, FREDERIC E. WELLS and FRANK O. WELLS, citizens of the United States of America, residing at Greenfield, in the county of Franklin and State of Massachusetts, have invented new and useful improvements in Automatic Turning-Lathes, of which the following is a specification.

This invention relates to automatic lathes for turning and shaping objects of metal or other substances, the object being to provide improved devices in this class of machines for facilitating and improving the quality of work produced thereby; and the invention consists in the peculiar construction and arrangement of the various parts of the lathe, all as hereinafter fully described, and more particularly pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side and Fig. 2 a front end elevation of an automatic turning-lathe embodying our improvements. Fig. 3 is a longitudinal sectional view of the main spindle of the machine, the chuck and chuck-operating tube; and of other mechanisms attached and contiguous to said spindle, all as below described. Fig. 4 is a perspective view of detail parts of the machine and is fully described below.

As heretofore constructed machines of this class have contained a hollow spindle (here represented by T) which has been so supported in its bearings that it had no endwise movement, but the bar or rod held and rotated thereby to be operated upon by a turning or cutting tool had a feed movement by hand or otherwise within said spindle. In the machine herein described, however, said spindle itself has an endwise feed movement, and thus carries said rod, which is held by said chuck, forward to said turning-tool, and the means for imparting said endwise or longitudinal movements thereto are constructed and arranged to operate as follows:

In the drawings, A indicates the frame of the lathe, and B the head thereof, secured on one end of said frame. The hollow spindle T of the lathe, in which rods are held and rotated, is supported in suitable bearings on said frame A, as shown in Fig. 1, and has a rotary motion imparted thereto by means of

a belt applied to a pulley 13 thereon. In what may be termed the "forward" end of said spindle is screwed a tapering bushing 3 for engagement with the tapered end of an ordinary tubular split chuck 4, which grasps and holds a rod while the latter is being operated upon, as below set forth. A chuck-operating tube Z, having one end engaging the rear end of said chuck 4, is adapted to have more or less of a sliding movement in said spindle T, whereby when a rod which is to be turned and operated upon is placed in said spindle passing through said tube Z, and through said chuck the latter is driven into said bushing 3, and the jaws of said chuck are made to clamp said rod, thereby compelling the latter to rotate with said spindle. When the force which drives said tube Z against said chuck ceases to act, the tendency of the spring-jaws of said chuck to open causes the latter to recede slightly from said bushing 3 and the said jaws to be separated, and thus free the rod heretofore held thereby, and such receding movement of the chuck causes a slight similar movement of the said tube Z. The said chucking and unchucking of the rod are performed by means of mechanism usually employed on automatic screw-machines and is as follows:

A cam-shaft 17, driven by a worm and gear, has secured thereon the cam-drums H and 10. By the revolution of the cam-drum 10 (see Fig. 1) in the direction of the arrow shown thereon the two oppositely-inclined cams 30 and 31, operating against the cam-studs 22 and 23 of the sleeves 7 and 8, impart to said sleeves a sliding movement in opposite directions on the arm 9, thereby causing a separation of the clutch-arms X X, pivotally secured in the collar W, fixed to the spindle, and the cone Y. Said sleeves 7 and 8 are connected by the forked arms 24 and 25 with the grooved collar M', fixed on the spindle, and the similarly-grooved end of the cone Y. Between said collar M' and said cone is located said collar W. A strap 15 is secured to the side of one of the sleeves, as 7, and the other sleeve has a stud 16 therein passing through a slot in said strap for limiting the degree of separation of the said two sleeves. The rod 40 is suitably supported in line with the axis of the hollow spin-

dle T by any convenient standard, as 41, with-
 in which it may be revolved by the said spin-
 dle; but sufficient friction in any convenient
 way is applied to the rod to prevent its being
 5 moved by the said spindle as the latter is given
 endwise movement in its bearings during the
 feeding operation, as described. With the
 parts in the position shown in Fig. 1 after said
 unchucking has taken place the cam-stud 22
 10 runs off of the cam 31, while the cam-stud 23
 continues in engagement with the longer cam
 30. Said continued engagement of the cam-
 stud with cam 30 imparts to the spindle T an
 endwise movement within its bearings. At
 15 the end of such endwise movement the adjust-
 able collar 20 on said spindle T is in contact
 with the end of the bearing in the frame A,
 and simultaneously with the running off of
 the cam-stud 23 from the cam 30 the cam 31^a
 20 engages the cam-stud 22, forcing the cone Y
 between the clutch-arms X and chucking the
 rod, as above described, said collar 20 hold-
 ing the spindle rigid against the action of the
 cam 31^a. Immediately following this opera-
 25 tion a suitably-located cam 31^b on said drum
 10, engaging with the stud 22, moves the spin-
 dle T toward the head B of the machine, carry-
 ing with it the rod to be operated upon.
 After that portion of the said rod which pro-
 30 jects through the head B of the machine has
 been operated upon and cut off the above-
 described operations for unchucking, feeding,
 and rechucking are repeated.

The construction and operation of the mech-
 35 anism on the head B of the machine, in con-
 junction with the operations of the spindle
 just described, are as follows:

The swinging tool-holder D is supported
 between suitable arms of said head B on the
 40 centers 14 14, the said centers being parallel
 with the spindle T. An arm 53 of said tool-
 holder projects transversely across the ma-
 chine at right angles to the axis of the said
 spindle. (See Fig. 2.) Through the extrem-
 45 ity of said arm 53 and adjustable therein is
 a stud J, the end thereof projecting through
 the lower side of said arm having a bearing
 on a sliding pattern-block I. Said block has
 a movement imparted thereto in line with the
 50 axis of the spindle T by the engagement of a
 cam-stud 21, projecting downwardly there-
 from, with suitably-located cams on the drum
 H. The surface of said pattern-block against
 which the stud J bears is given such surface
 55 configuration as is necessary to produce the
 required movements of the cutting-tool M
 against the end or side of the bar or rod 40
 which is being operated upon. The said cut-
 60 ting-tool M is clamped in the swinging tool-
 holder D in any suitable manner, the fine ad-
 justment thereof being regulated by the screw
 R bearing against the end of said tool, said
 screw adjustment being shown in Figs. 2 and
 4. As the said tool-holder D is oscillated on
 65 its centers 14 by the movement of the pat-
 tern-block I, as aforesaid, a spring 54 (shown
 in Figs. 1 and 4) tends to keep the stud J al-

ways in contact with said pattern-block by
 its compression between the arm F, secured
 to a stationary part of the head B, and a short
 arm cast on the side of the transversely-lo-
 70 cated arm 53 of the tool-holder D.

The machine may be so adjusted that the
 tool M in the holder D may begin its opera-
 75 tion on the end of the rod 40 as it begins to
 move forward through the head B, carried by
 the hollow spindle, as before described, and
 as it is fed through said head any desired
 movement may be given to the rocking tool-
 holder D by the surface configuration of the
 80 sliding pattern-block I and by varying the
 speed with which said block moves.

It is obvious from the above that a great
 variety of shapes can be automatically turned
 on this machine. 85

The pattern-blocks I are removably sup-
 ported in the frame of the machine, and hence
 any change of configuration of the piece to
 be turned is very rapidly made.

All changes to be made in the length of an
 90 article on this machine are made by chang-
 ing the pitch of the cams on said drum 10.

The cams on the drum H may be so arranged
 that the tool M in the tool-holder D may be
 brought to bear on the rod 40 while said rod
 95 is in motion endwise through said head, as
 above described, and the said tool then backed
 off until the rod has reached its limit of move-
 ment, when said tool M may again be brought
 to bear to make an annular cut therein, if
 100 desired, or, if the nature of the work to be
 turned permits the use of a suitably-shaped
 tool the said final motion given to the tool-
 holder D may serve to cut off the turned ob-
 105 ject or article from the end of the rod. In
 the machine shown in the drawings, however,
 a cutting-off device consisting of the lever C,
 hung on a stud K to the head B and carry-
 ing thereon a suitable tool-support, as E, for
 the cutting-off tool L, is provided, and this is
 110 the preferred construction. The said cut-
 ting-off tool is operated by a cam G, secured
 to the face of a plate *a* in such position and
 of the required shape to swing the tool L at
 the proper time against the rod 40 and cut off
 115 the finished article turned by the previous op-
 erations of the tool M on the end of said rod.

On the head B, in proper position verti-
 cally above said rod 40, as shown in Figs. 1
 and 2, are located the work-rests N, of the
 120 usual form and construction for keeping the
 said rod 40 in line with the center of the
 spindle when lateral pressure is brought to
 bear upon it by the transverse movement of
 either of the tools L or M, suitable projections,
 125 as 52, being cast on the side of the head for
 receiving said rests, and adjusting-screws O O
 and a binding-bolt P are provided for adjust-
 ing and securing said rests in their proper
 positions. 130

Rests of like construction can be, if desired,
 located on the opposite side of said head and
 at right angles to said rests N. One such rest
 is indicated by 52^a in Fig. 1.

Aside from the many advantages possessed by this machine as an automatic turning-lathe it possesses the further advantage of great simplicity of construction and the working parts thereof are all easy of access.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an automatic turning-lathe, a hollow spindle supported in suitable bearings in the frame of the machine, and movable longitudinally therein, a chuck in one end of said spindle, a cam-shaft having cam-drums thereon whereby said spindle is moved in its bearings and said chuck operated at the limit of movement of said spindle in either direction, combined with a tool-holder pivotally supported on the frame of the machine, a pattern-block having a sliding movement in said frame in line with said spindle, an arm on said tool-holder engaging said pattern-block, cams on one of said cam-drums for moving said pattern-block, and means for rotating said spindle and said cam-shaft, substantially as described.

2. In an automatic turning-lathe, a hollow spindle supported in suitable bearings in the frame of the machine, and movable longitudinally therein, a chuck in one end of said spindle, a cam-shaft having cam-drums thereon whereby said spindle is moved in its bearings and said chuck operated at the limit of movement of said spindle in either direction, combined with a tool-holder pivoted on each side of the center line of said spindle, and swinging transversely thereto, a cam on said cam-shaft for engaging and operating one of said tool-holders, and a pattern-block having a sliding movement on the frame of the machine engaging and operating the other of said tool-holders, suitable cams on one of said cam-drums for moving said pattern-block, and means for rotating said spindle and said cam-shaft, substantially as described.

FREDERIC E. WELLS.
FRANK O. WELLS.

Witnesses:

PEARL HASKINS,
JOHN D. BOUKER.