No. 647,084. Patented Apr. 10, 1900.

F. GIRARD.

TURNING LATHE.

(Application filed June 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

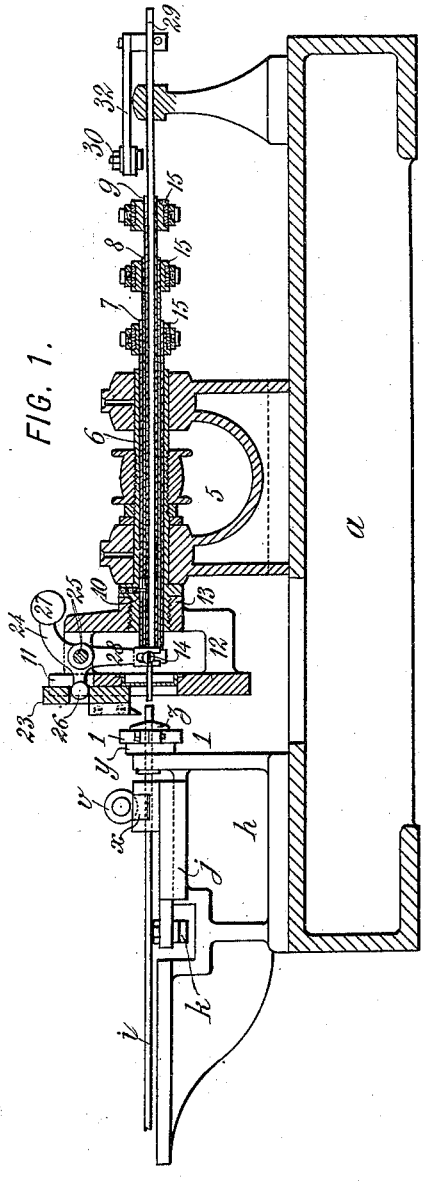
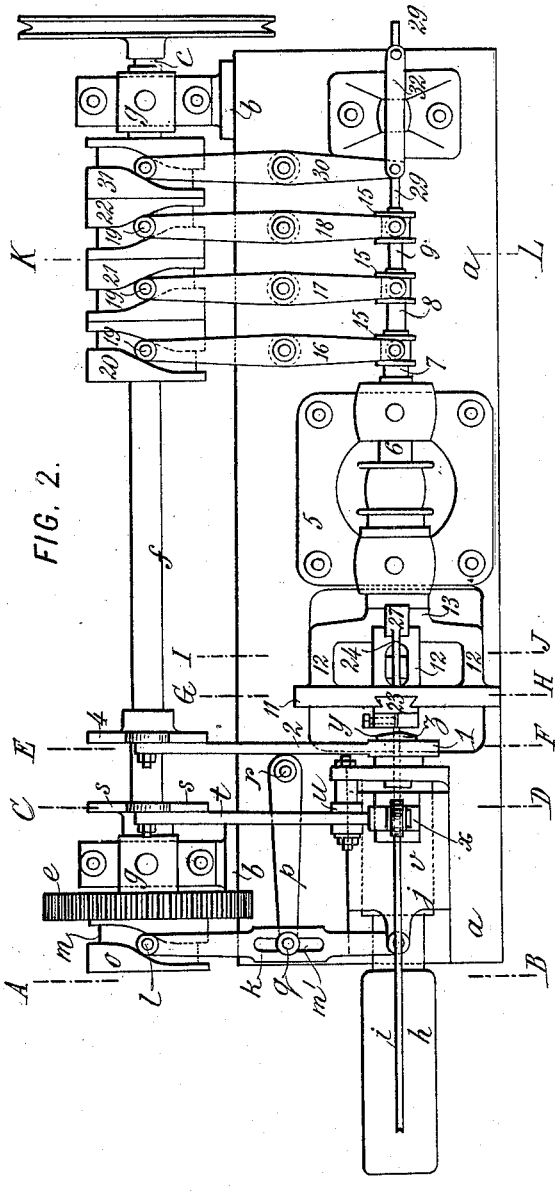


FIG. 2.



WITNESSES:
Fred. White
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FIG. 3.

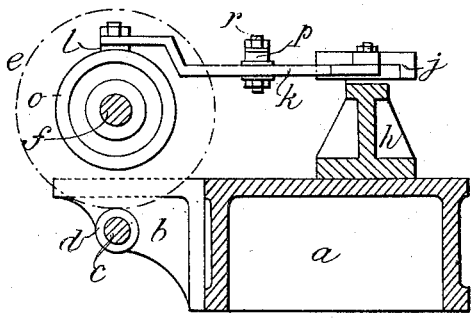


FIG. 4.

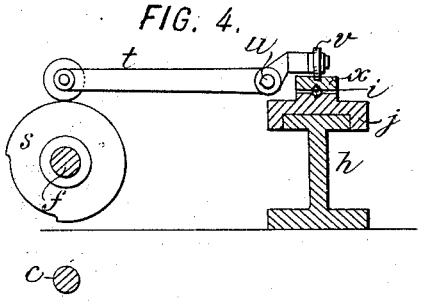


FIG. 5.

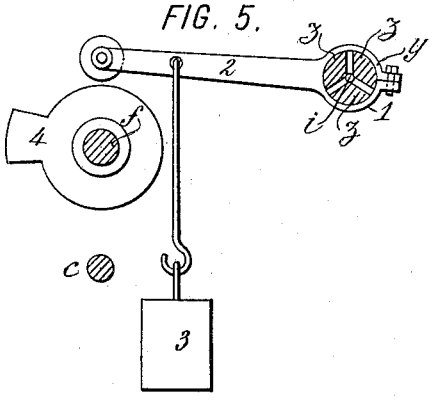


FIG. 6.

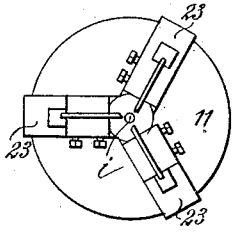


FIG. 7.

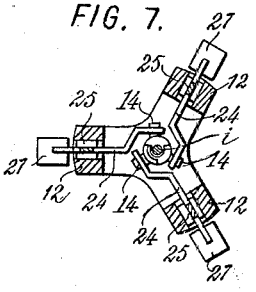
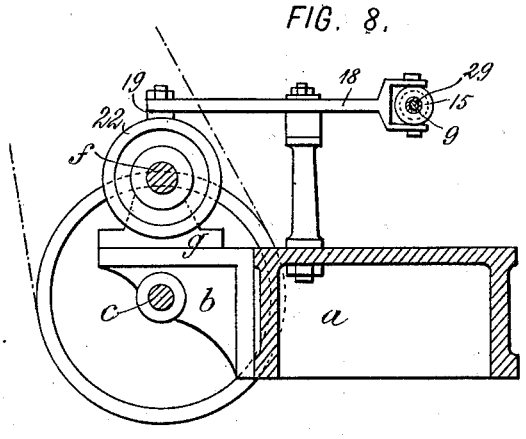


FIG. 8.



WITNESSES:

Fred. White

Thomas F. Wallace

INVENTOR:

Ferdinand Girard,

By his Attorneys:

Wilkinson, Fraser & Co.

UNITED STATES PATENT OFFICE.

FERDINAND GIRARD, OF PARIS, FRANCE.

TURNING-LATHE.

SPECIFICATION forming part of Letters Patent No. 647,084, dated April 10, 1900.

Application filed June 7, 1899. Serial No. 719,650. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND GIRARD, engineer, of 25 Rue Bolivar, Paris, in the Republic of France, have invented Improvements in Turning-Lathes, of which the following is a specification.

This invention has for its object an automatic turning-lathe in which in contradistinction to lathes as usually constructed, where the bar or the like to be worked turns in front of the tool, the bar does not turn and is worked successively or simultaneously by means of tools rotating around it or having simultaneously a straight-line movement radiating toward the center of the bar and an amplitude of movement regulated so as to give the predetermined diameter to the turned work.

In the accompanying drawings, Figure 1 is a longitudinal section of a lathe constructed according to the invention. Fig. 2 is a plan. Fig. 3 is a section on the line A B, Fig. 2. Fig. 4 is a section on the line C D. Fig. 5 is a section on the line E F. Fig. 6 is a section on the line G H. Fig. 7 is a section on the line I J. Fig. 8 is a section on the line K L.

The machine is constructed of a frame *a*, carrying two supports or bearings *b b*, in which there turns a shaft *c*, to which is keyed the pinion *d*, gearing with a wheel *e*, keyed upon the cam-shaft *f*, which latter shaft rotates in bearings *g*.

Upon the frame *a* there rests a frame *h*, carrying the feed mechanism. Upon this frame *h* there slides parallel to the bar *i* to be turned a carriage *j*, actuated by means of a lever *k*, the end of which is provided with a roller *l*, engaging in a groove *m* of a feed-cam *o*. The lever *k* is pivoted at *q* to the end of the lever *p*, connected at its other end to a fixed point *r*. The fulcrum which connects the levers *k* and *p* can be adjusted by means of a slot *m'* in the lever *k*, whereby the extent of movement of the carriage *j* can be regulated. A cam *s*, mounted upon the shaft *f*, actuates a lever *t*, which is pivoted at the point *u* and is strongly applied through the medium of the roller *v* upon the bearing *x*, which is directly in contact with the bar *i*, so as to clamp it against the carriage *j* during the feed movement.

The frame *h* has fixed upon it a mandrel *y*, designed to clamp the bar *i* during the turning operation. This mandrel (see Fig. 5) is provided with jaws *z*, which are held in a strap or collar 1, formed on one end of the lever 2, the other end of which is subjected to the action of the weight 3 for clamping the bar *i* and is actuated by the cam 4 for disengaging the said bar. The parts are so shaped that the jaws are clamped about the rod when the lever is in its lower position and are released when the lever is raised.

The tool-carrier comprises a head-stock or poppet 5, having two smooth bearing-surfaces or bearing-surfaces provided with ball-bearings for avoiding friction generated at high velocities. In this poppet 5, the axis of which should be arranged in alinement with that of the bar *i* to be worked, turns a hollow shaft 6, through which extend tubes sliding with slight friction one in the other telescopically. I will suppose, by way of example, that there are three of these tubes—viz., 7, 8, and 9—all being caused to take part in the rotary motion of the shaft 6 by means of a key 10, but being rendered quite independent of one another axially through the medium of slots in which the key 10 engages. Upon the end of the shaft 6 and opposite the mandrel *y* there is keyed a carrier-plate 11, connected to the shaft by means of three arms 12 and a boss 13, cast together, so as to leave a space between the shaft 6 and the plate 11. The ends of the tubes 7, 8, and 9 open into this space and are formed with expansions upon which are fixed three pivots 14, the object of which is hereinafter explained.

To enable the tubes 7, 8, and 9 to operate over one another at their expanded ends, suitable means for disengagement are formed therein. On the opposite side of the plate 11 the tubes 7, 8, and 9 are of unequal lengths, the tube of largest diameter being the shortest and the tube of smallest diameter being the longest, so that they can receive sleeves 15, which engage, respectively, in the jaws of the levers 16, 17, and 18, the other ends of which carry rollers 19, engaging in grooves in suitable cams 20, 21, and 22. On the outer surface of the plate 11 there are arranged three carriages 23, sliding in grooves formed in the thickness of the said plate and opposite the

arms 12 of the plate. In the thickness of each of the arms 12 of the plate there are fitted levers 24, having three arms and oscillating upon pivots 25. The end 26 of each of these levers 24 engages in a recess in the corresponding carriage 23, allowing a certain amount of oscillation. The extremity 27 of each lever 24 carries a weight designed to equilibrate during the rotation of the said plate 11 the centrifugal force to which the carriage 23, directly opposite it, is subjected, and also to compensate as far as possible for the disturbing effects caused by the displacement of the center of gravity of the carriage 23 with respect to the axis of rotation of the system. The third arm 28 of each of the levers 24 is formed at its end with a jaw and is connected to one of the tubes 7, 8, and 9 by means of the pivot 14, above mentioned, which is fixed to it. It will be obvious that any oscillating movement of the levers 16, 17, and 18 is transmitted to the carriages 23 and communicates to them the radiating motion above mentioned during the rotation of the plate 11.

I can provide a tube 29 to extend through the inside of the central tube 9, the said tube being quite independent and only having a longitudinal movement imparted to it by means of a lever 30, actuated by a cam 31 and connected to the tube 29 by the rod 32. This tube advances upon the end of the bar *i*, turned by the tools before the said worked part is detached from the bar. The different rods thus formed successively and separated from one another are pushed into the interior of the tube 29 and fall through the end thereof completely separated from turnings.

I claim—

1. In a lathe for turning articles from a bar, the combination with means for feeding the bar, and tools for shaping the articles, of a non-rotative central tube arranged in line with the bar, adapted to receive each article, whereby the articles after completion are guided by said tube and released at any desired point, and means for engaging the tube with the article before the separation of the latter from the bar.

2. In a lathe for turning articles from a bar, the combination with means for feeding the bar, of a plurality of shaping-tools rotatively mounted adjacent to the bar, and concentric tubes movable to actuate said tools to bring them into operative positions.

3. In a lathe for turning articles from a bar, the combination with means for feeding the bar, of a plurality of tools rotatively mounted adjacent to said bar, concentric tubes movable to actuate said tools to bring them into operative positions, and means for moving said tubes independently of one another.

4. In a lathe for turning articles from a bar, the combination with means for feeding said bar, of a hollow shaft carrying a plurality of tools, concentric tubes extending through said shaft, movable to bring said tools into operative positions, and means connecting said tubes with said tools.

5. In a lathe for turning articles from a bar, the combination with means for feeding said bar and means for holding it in position to be operated upon, of a rotative tool-carrier mounted on said shaft, a plurality of tools sliding in said carrier, concentric tubes extending through said shaft, connections between said tubes and tools, whereby said tubes move said tools into operative positions, and means for moving said tubes.

6. In a lathe for turning articles from a bar, the combination with means for feeding the bar, means for holding it in position to be operated upon, a rotative tool-carrier, tools carried thereby, means for moving said tools into operative positions, and a three-armed lever for each tool, one arm connected to the tool, the second arm connected to the means for moving the tool, and the third arm carrying a weight tending when said carrier is in rotation to counteract the effect of centrifugal force upon the tool.

7. In a lathe, the combination with a rotative tool-carrier and a tool mounted thereon, of a lever connected to the tool and a weight carried by the lever and adapted to be operated by centrifugal force to tend to counteract the effect of said force upon the tool, said lever fulcrumed on an axis extending at right angles to the axis of rotation of the tool.

8. In a lathe for turning articles from a bar, the combination with means for feeding the bar into position to be operated upon, and tools for shaping the articles, of intermittently-operated means independently of said feeding mechanism for clamping said bar during the shaping operation, comprising radial jaws, a collar for clamping said jaws, and a lever for rotating said collar, a cam for moving said lever in one direction, and a weight for moving it in the opposite direction.

In witness whereof I have hereunto signed my name, this 23d day of May, 1899, in the presence of two subscribing witnesses.

FERDINAND GIRARD.

Witnesses:
EDWARD P. MACLEAN,
AUGUSTE MATHIEU.