No. 753,158. PATENTED FEB. 23, 1904.

T. W. R. McCABE.

METAL TURNING MACHINE.

APPLICATION FILED JULY 2, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

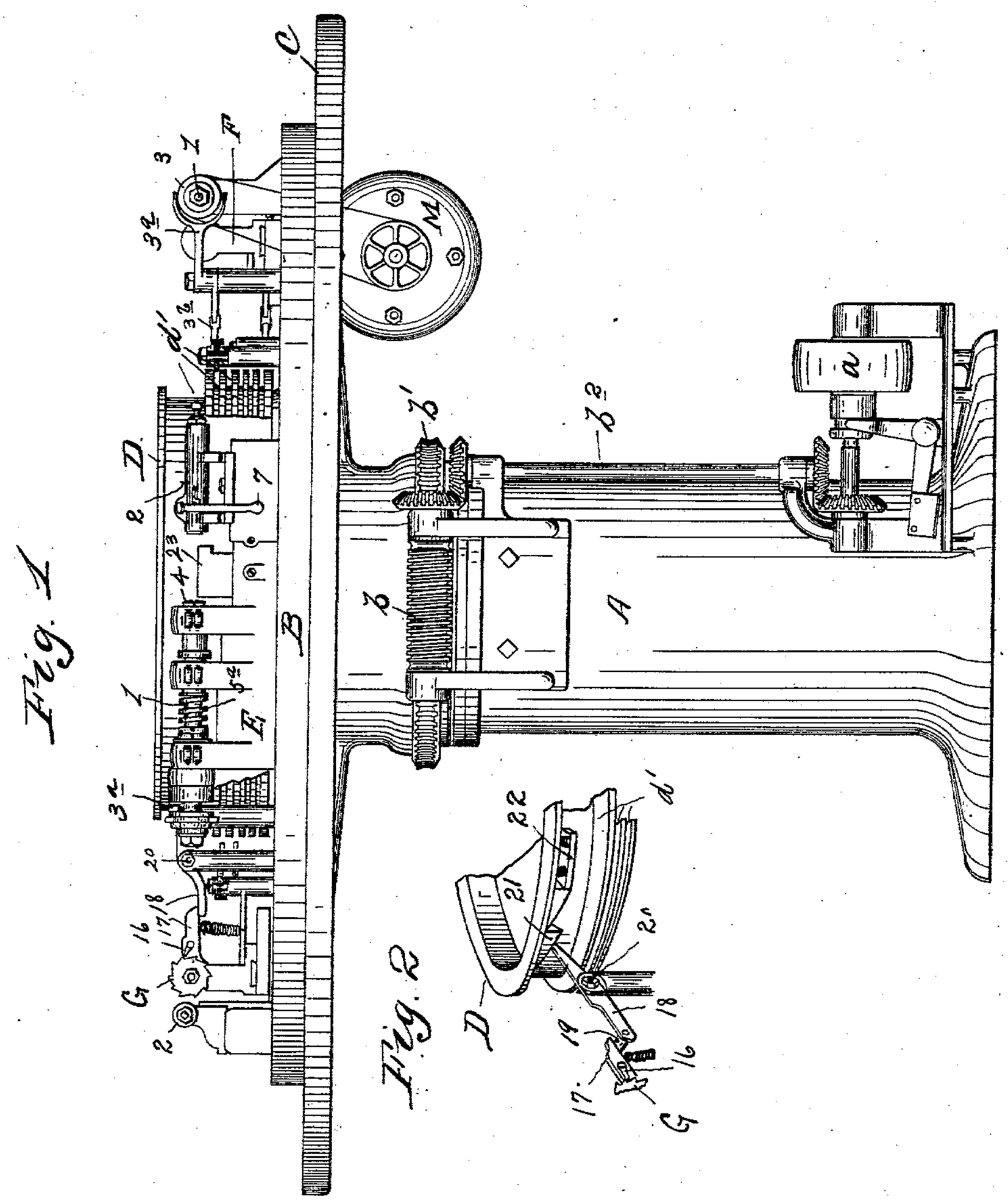

Fig. 1

Fig. 2

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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 4

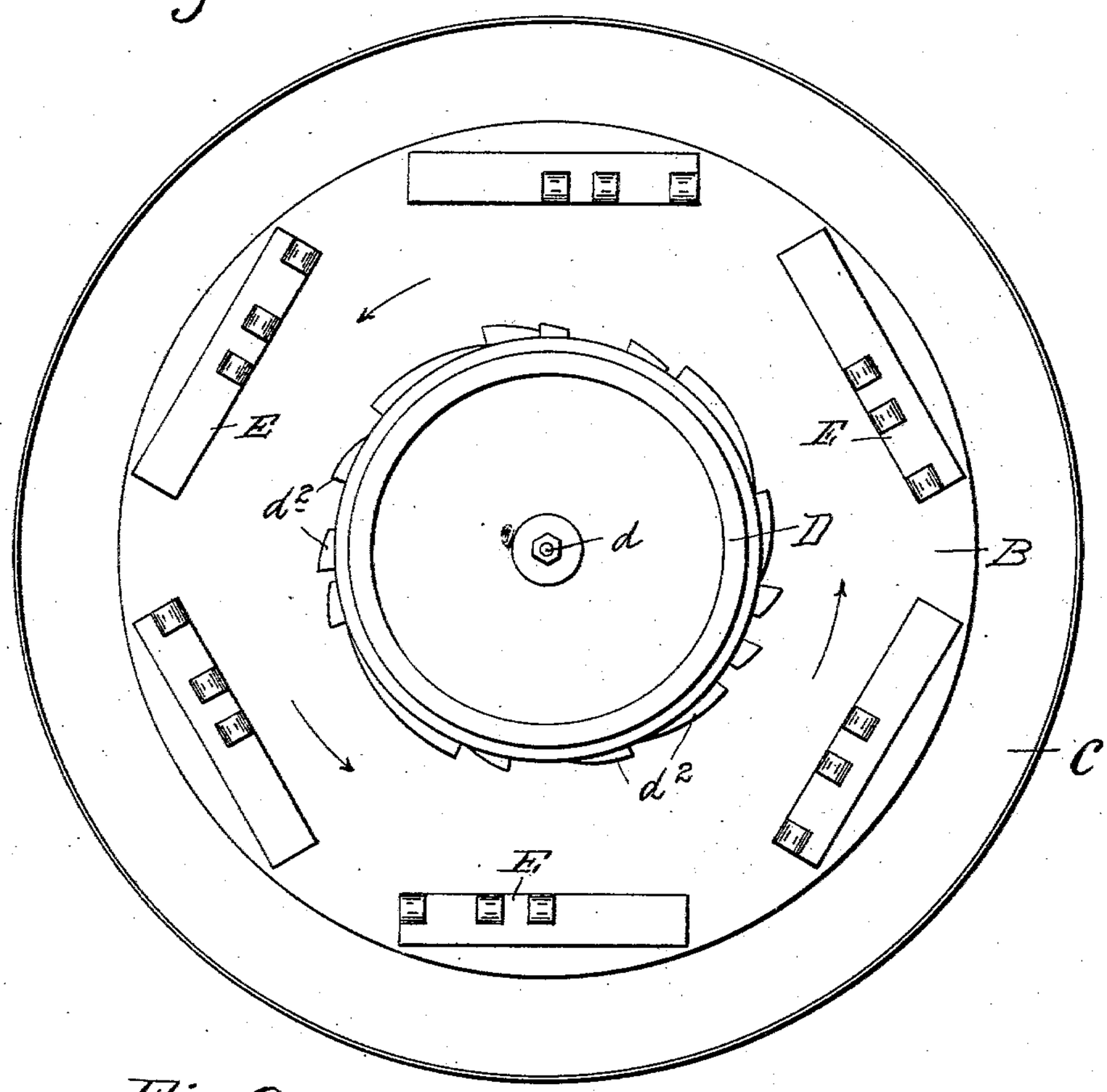
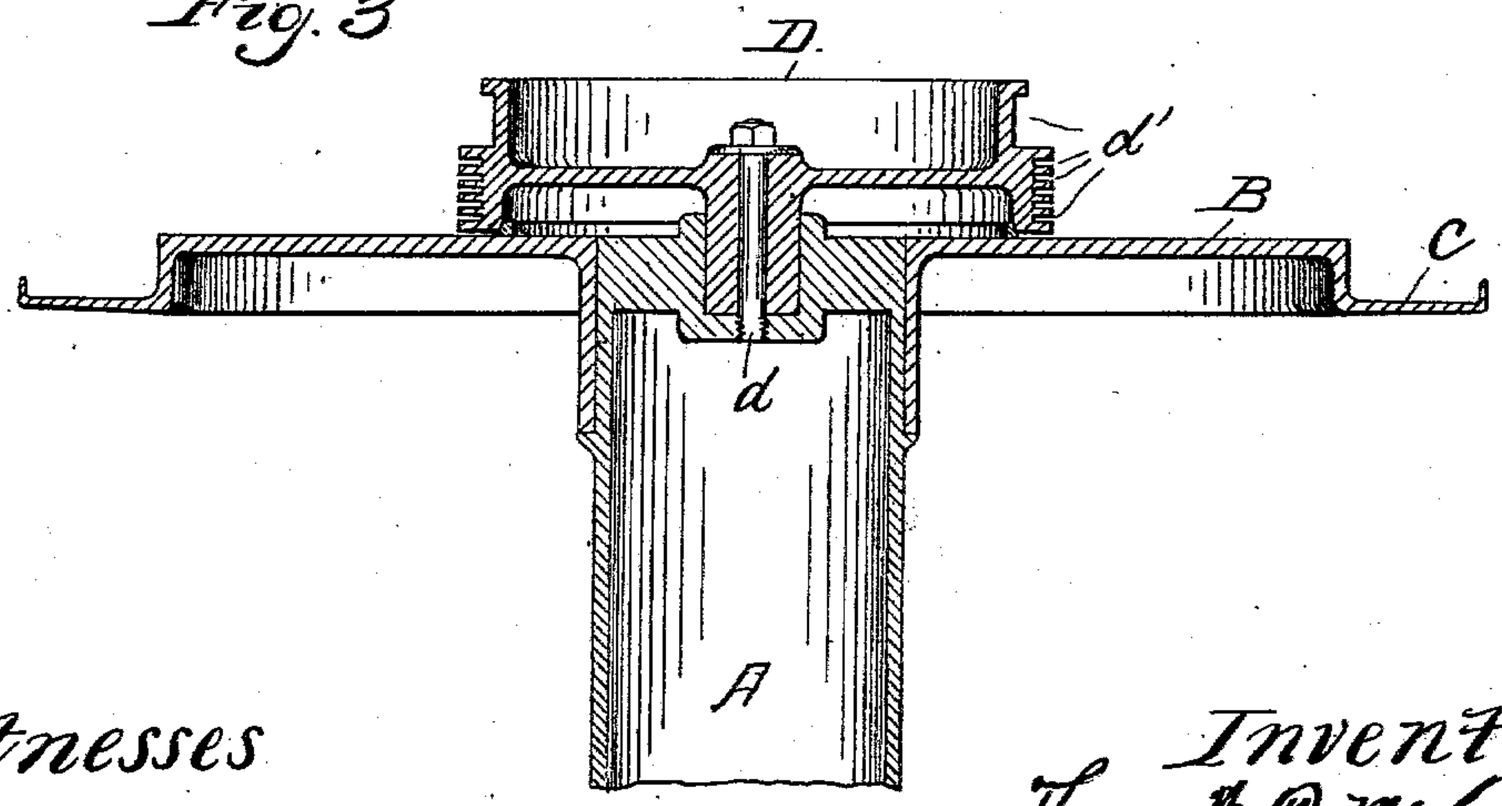


Fig. 3



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METAL TURNING MACHINE.

APPLICATION FILED JULY 2, 1902.

NO MODEL. 4 SHEETS—SHEET 3.

Fig. 5

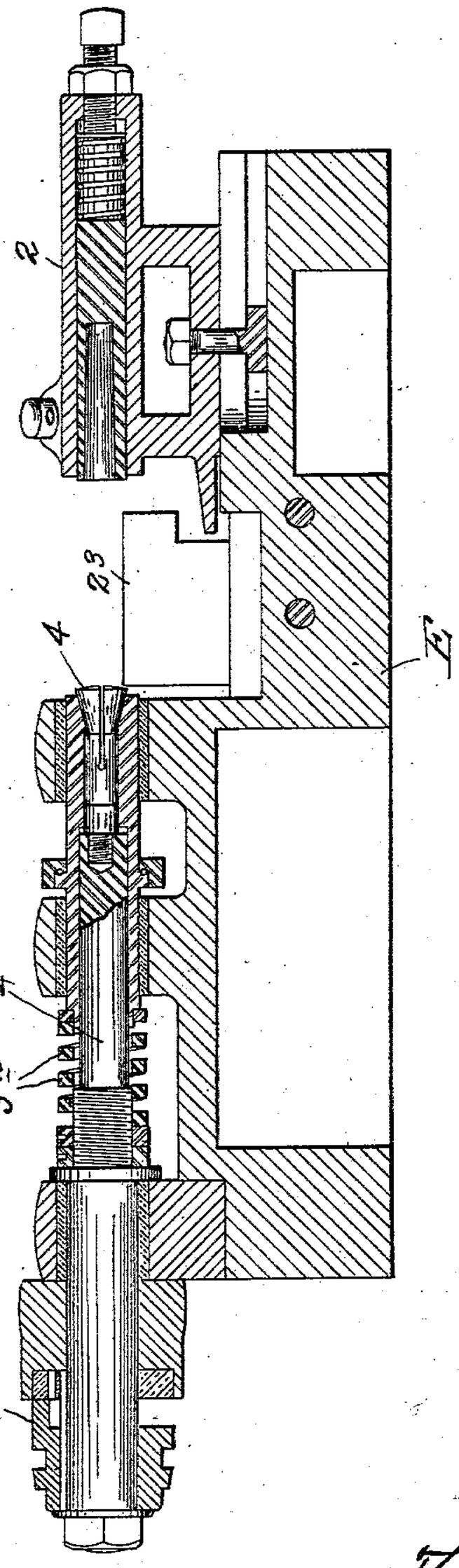

Fig. 6

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METAL TURNING MACHINE.

APPLICATION FILED JULY 2, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

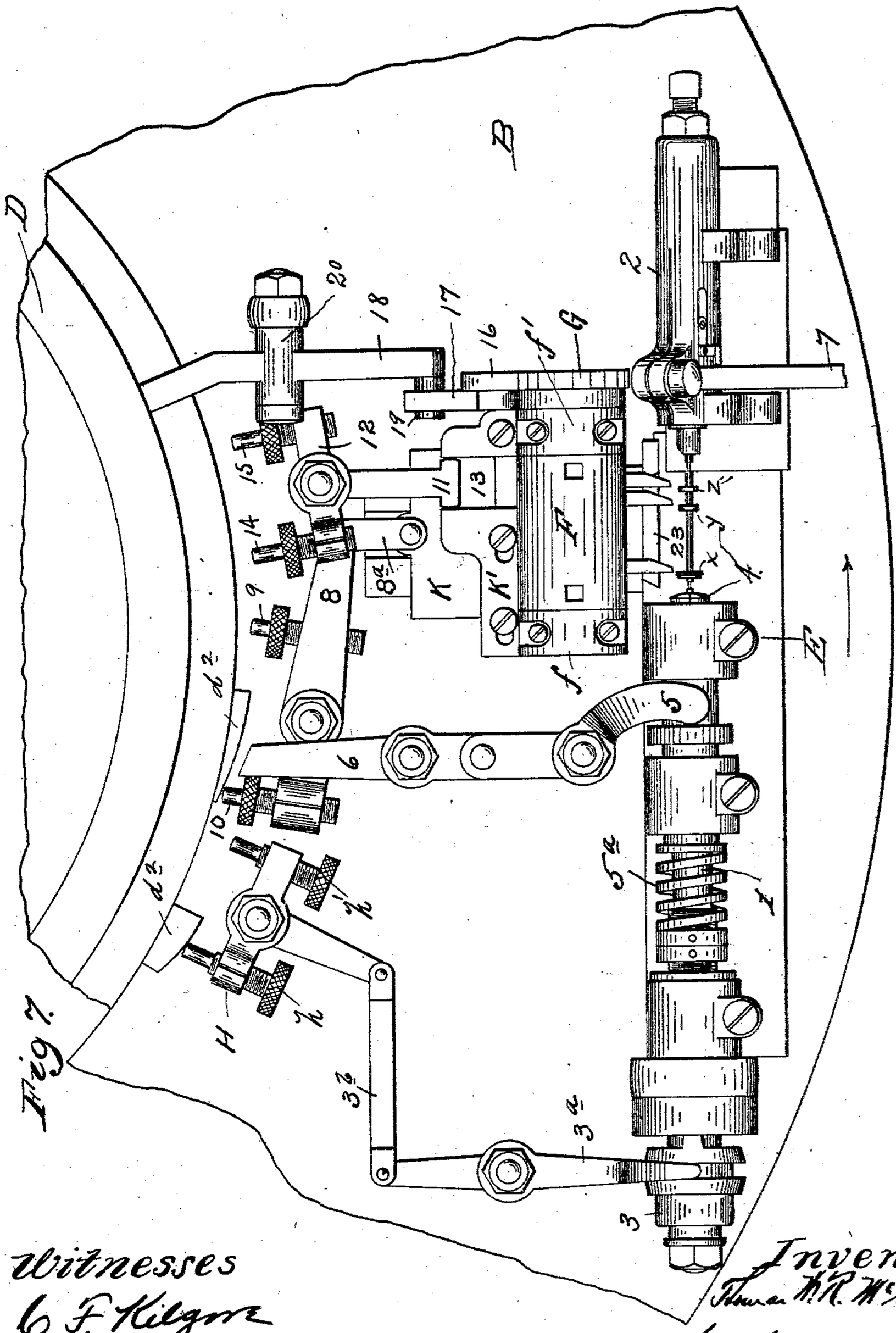

Fig 1.

Witnesses
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No. 753,158. Patented February 23, 1904.

UNITED STATES PATENT OFFICE.

THOMAS W. R. McCABE, OF WINSTED, CONNECTICUT.

METAL-TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 753,158, dated February 23, 1904.

Application filed July 2, 1902. Serial No. 114,155. (No model.)

To all whom it may concern:

Be it known that I, THOMAS W. R. McCABE, a citizen of the United States of America, residing at Winsted, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Metal-Turning Machines, of which the following is a specification.

The object of my invention is to provide a machine of the class specified having features of novelty and advantage and adapted for producing work of the required precision and nicety at a small expense of operation.

My invention consists in the combination of a stationary cam-holder and a table rotating thereabout, suitable tools being carried by the table and having operating-levers which are controlled in their movements by the cams.

My invention also embodies the details of the construction whereby the desired object is attained.

In the drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a detail view of the turret-controlling devices. Fig. 3 is a vertical sectional view showing the column on which the rotating table is located and the cam-holder. Fig. 4 is a plan view of the table and the cam-holder. Fig. 5 is a sectional view through one of the lathes. Fig. 6 is a detail view of the frictional drive for the spindle. Fig. 7 is a plan view of one of the lathes, showing in detail the operating mechanism.

I will describe in detail the construction of my machine, from which its operation will be clearly understood.

A is the column, upon which is mounted the table B, having the trough C. The table B is driven by the worm-gear b' and the screw b, which is operated through suitable connections to the shaft b^2, which in turn is geared to the shaft of the pulley a. To the top of the column is fixedly secured the cam-holder D by means of the bolt d. As will be seen from Fig. 3, this cam-holder has a series of circumferential grooves d', in which are mounted cams d^2 for operating the lathe and tool-holder. On the table B are located a number of lathes E, as shown in Fig. 4. These lathes are in general of the ordinary type of jewelers' lathes, and the number employed is not material. They are equipped with the ordinary spindle 1, tail-stock 2, frictional driving-clutch 3, and the chuck 4, as is clearly shown in Fig. 5.

Mounted on the table in operative relation to the lathe is the tool-holder or turret F, which is cylindrical in form and mounted in suitable bearings $f\,f'$ and carries the tools projecting radially therefrom. The bearings of this turret are mounted on a carriage having a compound slide toward and away from the lathe and lengthwise thereof, the part K moving toward and away from the lathe and the part K′ moving lengthwise thereof, being operated in a manner to be hereinafter described. The shaft on the tool-holder F carries at one end the ratchet G, which coöperates with a tripping-pawl 16, carried by a reciprocating arm 17, which in turn is acted upon by the lever 18 through the pin 19. The lever 18 is pivoted, as at 20, and its free end is engaged by suitable cams, as shown at 21 in Fig. 2, which are so arranged that they will trip the lever and through the pawl-and-ratchet-wheel connection turn the turret so as to present the proper tools to the work at the proper time. Between these cams 21 are arranged spring-pressed plates 22, against which the free end of the lever 18 rests, exerting a continual pressure on the turret, which tends to hold the tools down on the tool-rest 23 and prevents their vibration or what is known as "chattering."

Each lathe is driven independently, as by a motor M, and it is to be understood that the table is continuously rotating about the column A and the cam-holder D. All the motions of the lathes and the turret are controlled automatically by levers, with the exception of the tail-stock, which is operated in the usual manner by the attendant through the lever 7.

The frictional driving-clutch has the pivoted shifting lever 3^a, connected through the link 3^b with the double-ended trip H, carrying the adjustable contact-pieces $h\,h'$, which lie in different planes. The chuck is opened by the lever 5, connected with the lever 6, and is closed by the spring 5^a as soon as the lever 6 rides off of its operating-cam. The movement of the carriage K toward and away from the lathe is controlled by the lever 8, connect-

ed with it by the link 8^a and having the contact-points 9 10, which are located in different planes. The lengthwise movement of the carriage K′ is controlled by cross-head 11, which works in the slot 13 and is moved by the trip 12, having the contact-points 14 15, which are located in different planes. Each contact-point of the operating-lever has its corresponding cam properly positioned in the cam-holder so that as the table rotates the levers are moved by cams to perform their work at the proper moment.

But a single attendant is needed for this machine, and his position may be taken at a point about opposite the cam which operates upon the lever 6 to open the chuck through the lever 5. At this time the clutch 3 is out of engagement and the lathe-spindle is still. By throwing the tail-stock lever 7 a piece of work may be inserted in the lathe. As the lever 6 rides off of its cam the spring 5^a closes the lathe-chuck and the piece of work is securely positioned. The contact-point h' of the trip H is now moved by its cam, throwing in the clutch 3 and setting the lathe-spindle in motion. Assuming that the proper tools are in position ready for the work and that the first operation is to top off the collars $x\,y\,z$, which are seen in the piece of work in the lathe, the contact-point 9 of the lever 8 will next be engaged by its cam to move the turret-carriage up the proper amount. The contact-point 15 of the trip 12 will next be engaged by its cam moving the carriage K′ to the left through the cross-head 12 working in the groove 13. This movement accomplishes the topping operation. The contact-point 14 is next engaged to move the carriage K′ back to the right. The contact-face 10 is now engaged to withdraw the turret. The lever 18 through the pawl 16 engages the ratchet G and turns the turret to present a new set of tools, which we may assume are the tools for facing one side of each of the collars $x\,y\,z$. The contact-piece 8 is engaged by its cam and moves the carriage in performing the facing operation. When this is finished, the contact-piece 10 is engaged by its cam and the carriage withdrawn. The turret is turned again by the lever 18 to present a third set of tools, which may be for facing the other sides of the collars, and the bell-crank lever 8 is operated in the same way with the same results. Another set of tools may be presented for turning down the pinions at each end of this shaft. The several operations will probably have consumed most of the time required by the table in making one revolution. After the last operation is performed the contact-piece h is engaged by its cam and throws the clutch 3 out of engagement. The lever 6 now rides upon its cam and opens the jaw 4, the tail-stock lever 7 is operated by the attendant, and the piece drops out and a new piece is inserted, and the same sequence of operation is gone through again. Each lathe is initially provided with a rough piece of work, and in its course of travel the necessary operations are performed upon it, and when it returns to the place where the work was inserted a finished article is delivered.

In Fig. 4 I have shown several cams d^2 mounted in the cam-holder. These cams are not arranged in any particular order, but are simply shown to indicate how they will look from a top view of the holder.

In describing the operation of this machine I have confined myself to the conditions to be met in finishing what is known as a "clock-pinion"—a shaft with the three collars $x\,y\,z$. It must be evident that a large variety of work can be done on a machine of this kind, it being only necessary to properly adjust the cams to move the parts as and at the time desired. All parts would operate in the same way, the adaptation of this machine for different sized and styles of work being merely a matter of readjustment.

I claim as my invention—

1. In a machine of the class specified a cam-holder, and a table, one of which is mounted in operative relation and rotatable independently of the other, said table carrying tools, each of which has a plurality of moving parts operatively connected to the tool, whose movements are controlled by the cams carried by the cam-holder.

2. In a machine of the class specified the cam-holder and the table, one mounted in operative relation to and rotatable independently of the other, cams carried by the cam-holder, lathes carried by the table, and controlling mechanism, connected with the movable parts of the lathes, actuated by the cams in the cam-holder, substantially as described.

3. In a machine of the class specified the base supporting a cam-holder and a table, one of said parts being surrounded by the other, means for rotating one of said parts independently of the other, cams carried by the cam-holder, lathes carried by the table, and controlling mechanism, attached to the moving parts of the lathes, actuated by the cams, substantially as described.

4. In a machine of the class specified the standard supporting a stationary cam-holder, a rotatable table which surrounds said cam-holder, and means for imparting rotary motion to said table, said table carrying tools, each of which has a plurality of moving parts operatively connected to the tool, whose movements are controlled by the cams carried by the cam-holder.

5. In a device of the class specified a cam-holder, a table surrounding said cam-holder, means for causing the table to rotate about the cam-holder, cams carried by the cam-holder, a plural number of lathes carried on the table, a turret carried on the table and supporting tools adapted to coöperate with the

lathe, and levers connected with the movable parts of the lathes and turrets and actuated by the cams.

6. A cam-holder, cams carried thereby, a table surrounding said cam-holder and adapted to rotate about it, lathes and their coöperating turrets carried by the table, means for driving the spindles of the lathes, and levers connected with the moving parts of the lathes and turrets actuated by said cams, substantially as described.

7. A cam-holder, a table surrounding the cam-holder and adapted to rotate thereabout, cams carried by the cam-holder, lathes carried by the table, driving mechanism for the lathe-spindles, and means actuated by one set of cams in the cam-holder for throwing said driving mechanism into and out of driving engagement with the lathe-spindle, substantially as described.

8. A cam-holder, cams carried thereby, a table surrounding the cam-holder and adapted to rotate thereabout, lathes carried by the table, driving mechanism for the lathe-spindles controlled by a clutch mechanism, and a double-ended lever connected with said clutch and actuated by one set of cams on the cam-holder, substantially as described.

9. A cam-holder, cams carried thereby, a table surrounding the cam-holder and adapted to rotate thereabout, lathes carried by the table, the lathe-chuck normally closed by a spring, and a lever actuated by a set of cams in the cam-holder for releasing the jaws of said chuck, substantially as described.

10. The cam-holder, cams carried thereby, a table surrounding the cam-holder and adapted to rotate thereabout, and lathes carried by the table; in combination with the turrets and means operating with said cams for moving the turret toward and away from and lengthwise of the lathe.

11. The cam-holder, cams carried thereby, a table surrounding the cam-holder and adapted to rotate thereabout, and lathes carried by the table; in combination with cylindrical turrets rotatably supported in suitable bearings, with their axes substantially parallel to the axes of the lathes; mechanisms coöperating with said cams for rotating each turret, for moving each turret toward and away from the lathe, and for imparting to each turret a reciprocating motion lengthwise of the lathe.

12. The cam-holder, cams carried thereby, a table surrounding the cam-holder and adapted to rotate thereabout, and lathes carried by the table; in combination with cylindrical turrets rotatably supported in suitable bearings, with their axes substantially parallel to the axes of the lathes, the stationary tool-rests; mechanisms coöperating with said cams for rotating each turret, for moving a turret toward the lathe and away from it free of the tool-rest, and for reciprocating each turret in a direction lengthwise of the lathe, substantially as described and for the purposes set forth.

13. The cam-holder, cams carried thereby, a table surrounding the cam-holder and adapted to rotate thereabout, and lathes carried by the table; in combination with cylindrical turrets rotatably supported in suitable bearings, with their axes substantially parallel to the axes of the lathes, the stationary tool-rests, tools projecting radially from the turrets, mechanism coöperating with said cams for rotating each turret, for retracting a turret and holding it in that position while it is being rotated, for advancing a turret, and yielding means for holding the tools on the tool-rests.

14. In a machine of the class specified the stationary cam-holder, the table rotatably mounted with relation thereto, one or more lathes mounted on the table and driving mechanism therefor, cams carried by the cam-holder and operating-levers coacting with said cams for controlling the operation of the lathes, as and for the purposes specified.

15. In a machine of the class described the stationary cam-holder, the table rotatably mounted with relation thereto, cams carried by the cam-holder, lathes mounted upon the table and driving mechanism therefor, levers for controlling the operation of said lathes, one or more of said levers being operated by the cams in the cam-holder, substantially as set forth.

16. In a machine of the class specified in combination the stationary cam-holder the cams carried thereby, the rotatable table, the lathes and turrets mounted thereon, driving mechanism for the lathes, levers connected with the moving parts of the lathes and turrets and adapted to control the operation thereof, said levers being actuated by cams as and for the purposes specified.

17. In combination in a machine of the class specified the stationary cam-holder, the table rotatably mounted with relation thereto, means for moving the table, independently-driven lathes mounted on said table, turrets coöperating with said lathes, levers connected with the moving parts of the lathes and turrets and adapted to be actuated by cams in the cam-holder, all substantially as described and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS W. R. McCABE.

Witnesses:
GEORGE F. RUPP,
SINGNE O. THORELL.