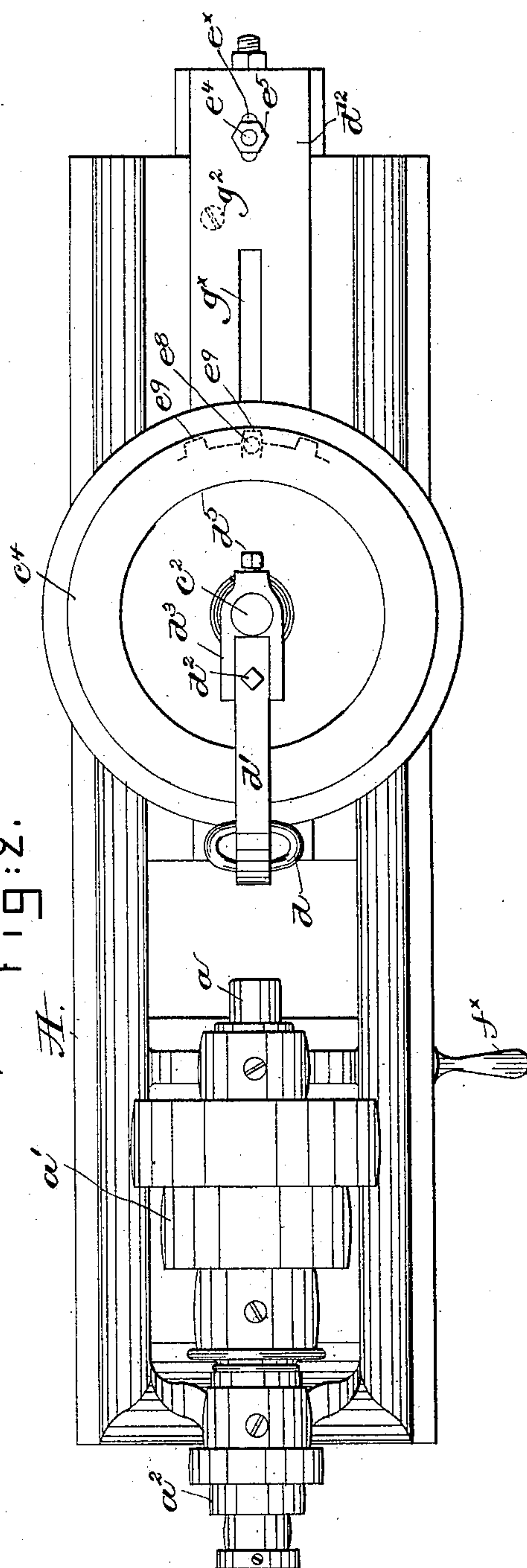
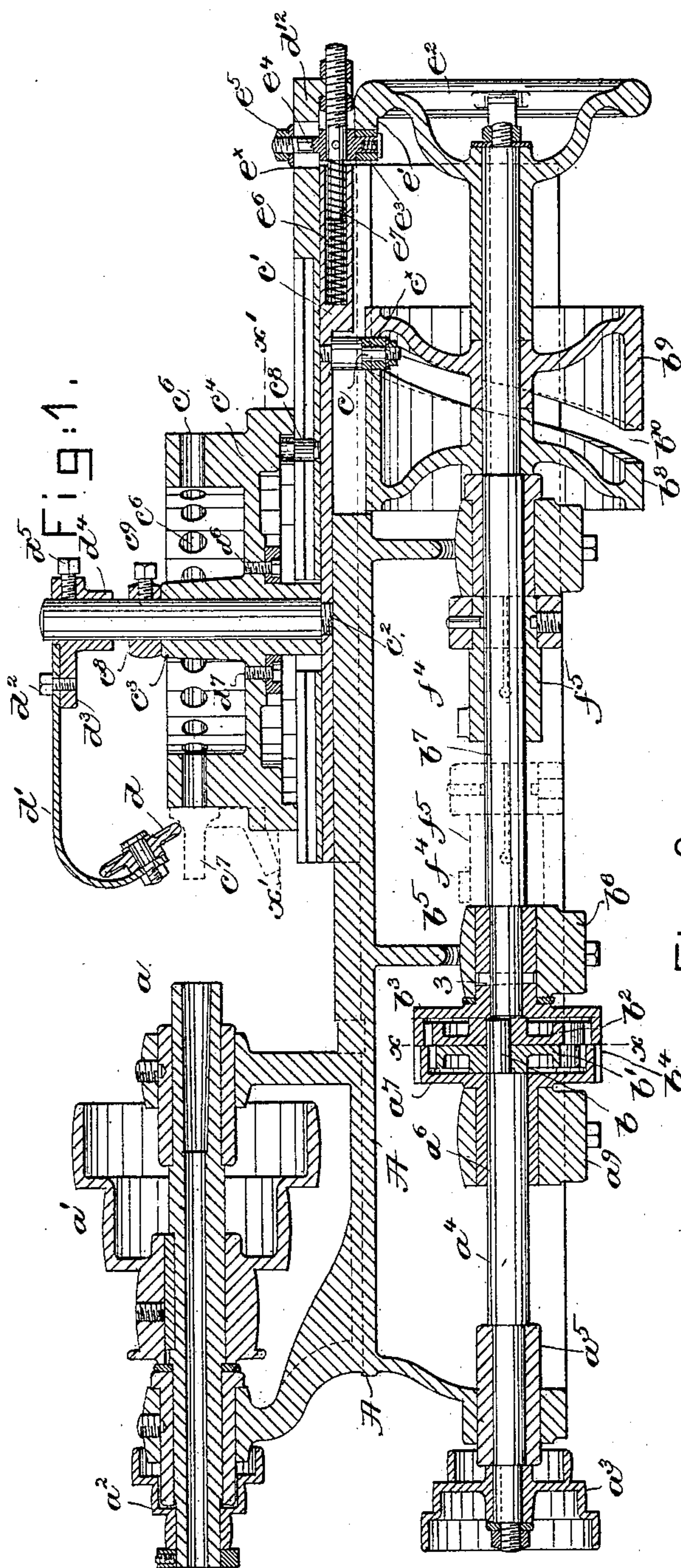


LATHE.

No. 379,568.

Patented Mar. 20, 1888.



Witnesses.

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(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

RIMMON C. FAY, OF HOPEDALE, MASSACHUSETTS.

LATHE.

SPECIFICATION forming part of Letters Patent No. 379,568, dated March 20, 1888.

Application filed September 13, 1887. Serial No. 249,558. (No model.)

To all whom it may concern:

Be it known that I, RIMMON C. FAY, of Hopedale, county of Worcester, and State of Massachusetts, have invented an Improvement in Lathes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to lathes, and is shown embodied in a drilling-lathe, wherein the work-supporting table is continuously reciprocated by a cam-feed until automatically stopped, as will be described.

The reciprocation of the work-supporting table is effected, as herein shown, by a stud secured to the said table and engaging a cam-groove in a cylinder on a shaft, which is rotated, as shown, by a differential gearing, to be hereinafter described.

Another feature of my invention consists of a work-holding turret provided with a yielding or spring clamping device, which presses upon and holds the work in the said turret.

Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a longitudinal section of a lathe embodying my invention; Fig. 2, a top or plan view of the lathe shown in Fig. 1, the hand-wheel being omitted; Fig. 3, an end view of the lathe, looking to the left in Fig. 1; Figs. 4 and 5, sectional details to be referred to, the section being taken on line $x x$, Fig. 1; Fig. 6, a section of Fig. 1 on line $x' x'$; Fig. 7, a section of Fig. 6 on line $y y$; Fig. 8, a top view of the hand-wheel detached; Figs. 9 and 10, details to be referred to, Fig. 10 being a section of Fig. 9 on line $y' y'$.

The lathe-bed A, the spindle a , and cone a' are as usual in lathes of ordinary construction. The spindle a near its rear end has mounted upon it a driving feed cone-pulley, a^2 , which in practice is connected to and drives a cone-pulley, a^3 , on a shaft, a^4 , having bearings, as shown, in a bushing, a^5 , and in a hub, a^6 , of a gear, a^7 , the said hub being loose in a bushing, a^8 . The shaft a^4 has a crank-pin, b , upon which are loosely mounted two toothed gears, b' b^2 , (see Figs. 4 and 5,) fastened together, one gear, as b' , having a less number of teeth than the gear b^2 . The teeth of the

gears b' b^2 mesh with teeth at the interior of the gears a^7 b^3 , respectively, the gear a^7 also having external ratchet-teeth, b^4 . (See Fig. 4.) The gear b^3 has a hub, b^5 , loose in a bushing, b^6 , supported by the frame of the lathe, the said hub having pinned or otherwise fastened to it, as at 3, (see Fig. 1,) one end of a shaft, b^7 . The shaft b^7 has mounted upon it, as herein shown, two cylinders, b^8 b^9 , shaped to leave a cam-groove, as b^{10} , between them when fitted upon the said shaft. The cam-groove b^{10} receives within it, as shown, a trundle, c^x , mounted on a stud, c , secured to the under side of the work-supporting table c' , herein shown as dovetailed onto the lathe-bed A, (see Fig. 3,) the said cam-groove acting on the said trundle to produce a forward and backward movement of the said work-supporting table when the shaft b^7 and cam-cylinder are revolved, as will be described.

The reciprocation of the work-supporting table may be regular or irregular. It may have a slow forward and a quick return or backward movement, or vice versa; or the forward and backward movements may be alike, or any other desired movement may be obtained by changing the form of the cam-groove b^{10} . The table c' has secured to it, as shown, a post, c^2 , upon which is placed the hub c^3 of a revolving work-holding turret, c^4 , having suitable holes, c^5 , herein shown in its periphery to constitute receivers adapted to receive the pieces, c^7 , of work to be operated upon by a tool, (not shown,) but which in practice is carried by the spindle a , in usual manner, the said work-holding turret being prevented from rising up away from the table c' , as herein shown, by a collar, c^8 , fastened on the post c^2 by the set-screw c^9 . The receivers of the turret will be adapted in shape to the things to be held by them. The piece, c^7 , of work is held firmly in position while the tool is acting upon it, as shown, by a holder shown as a trundle-roller, d , secured to the end of a bent spring-arm, d' , fastened, as shown, by screw d^2 to a flange, d^3 , of a collar, d^4 , secured to the post c^2 by a set-screw, d^5 . The spring-arm d' presses upon the work c^7 and holds it firmly in place, and its spring qualities accommodate it to work of irregular or varying size. The turret c^4 has secured to it, as shown, by screws

d^6 , a toothed or ratchet wheel, d^7 , (see Fig. 6,) the teeth of which are engaged, as shown, by a stud, d^8 , on a pawl, d^9 , pivoted at d^{10} to the bar or plate d^{12} , adapted to slide in a guide in the table c' , the said pawl being kept in engagement with the ratchet-wheel d^7 , as shown, by a spring, e , secured to the slide-plate d^{12} . The ratchet-wheel d^7 preferably has as many teeth as there are receivers c^6 in the turret c^4 , and the said ratchet is turned one tooth at a time to revolve the said turret, so as to bring the receivers c^6 , containing the work to be operated upon, one by one in succession into position to be acted upon by the tool carried by the spindle a , by a cam, e' , herein shown on the periphery of the hand-wheel e^2 . (See Figs. 1 and 8.) The cam e' , as shown, acts upon a trundle, e^3 , (see Fig. 1,) secured to a stud, e^4 , extended up through a slot, e^x , in the slide bar or plate d^{12} , and secured thereto by the nut e^5 , the said cam at each revolution of the shaft b^7 moving the said plate d^{12} forward, thereby revolving the turret, as above described.

The slide-plate d^{12} (see Fig. 1) is restored to its normal position, as herein shown, by a spring, e^6 , on a rod, e^7 , secured to the stud e^4 , fastened to the said slide-plate, the said spring being located in a groove or pocket in the work-supporting table, one end of the said spring bearing against the stud e^4 and the other against the end of the said groove or pocket.

The turret c^4 may be revolved a greater or less distance, as desired, by changing the position of the stud e^4 in the slot e^x in the slide-plate d^{12} . As the slide-bar is moved back to its normal position, a locking-pin, e^8 , on the said slide-bar (see Fig. 1, and dotted line, Fig. 2) enters a notch, e^9 , in the turret, thereby locking the work-holding turret until the next forward movement of the slide-plate, the stud d^8 not engaging with the ratchet-wheel on the next forward movement of the slide-plate until the locking-pin has been removed from the notch e^9 , thus permitting the turret to be revolved by the said ratchet-wheel and pawl. The shaft b^7 , and with it the cam-cylinder, is revolved, as herein shown, to produce the reciprocation of the work-table c' by a differential movement produced by the two sets of gears a^7 b' and b^2 b^3 , substantially as described in United States Patent No. 158,035, dated December 22, 1874, to which reference may be had.

The gear a^7 is herein shown as provided with teeth on its periphery, which teeth are adapted to be engaged by a pawl, f , on a short shaft, f' , parallel to and behind the shaft b^7 , the said shaft f' having near its other end an arm, f^2 , (see dotted lines, Fig. 3,) which in practice is made to extend over a lug or projection, as f^4 , fast on a sliding hub, f^5 , loose on the shaft b^7 , and constituting part of an automatic feed-stopping device.

The pawl f may be engaged and disengaged from the teeth of the gear a^7 by the handle f^x , fast on the shaft f' . (See Figs. 2 and 3.)

The pawl f constitutes a stopping device for

the movement of the feed-cam, and when the pawl is disengaged from the ratchet-teeth of the gear a^7 the said gear and the gears b' and b^2 are revolved through the crank-shaft a^4 , as fully described in the patent referred to, the gear b^3 and shaft b^7 at such time remaining stationary. When the pawl is in engagement with the ratchet-teeth of the gear a^7 , the said gear is held stationary, and the gears b' , b^2 , and b^3 are driven positively, thereby rotating the shaft b^7 and reciprocating the work-supporting table through the cam-cylinder. The rotation of the shaft b^7 , and thereby the feed of the cam-cylinder, may be stopped by disengaging the pawl f from the ratchet-teeth of the gear a^7 through the handle f^x , or by moving the hub f^5 from its full into its dotted line position, Fig. 1, so that the cam-lug f^4 will act upon the arm f^2 .

I prefer to employ the differential movement herein shown; but instead thereof I may use any other usual or well-known equivalent mechanism for producing the feed.

Figs. 9 and 10 show a modified form of work-holder, consisting of a casting or fixture, g , secured by bolts g' , inserted in a T-guide, g^x , in the slide bar or plate d^{12} , as herein shown, the said slide-bar, when the casting is used, being fastened by a screw, g^2 , (see Fig. 2,) to the table c' .

The casting or fixture g is slitted for a portion of its length, as shown, as at g^{10} , and is provided with a hole in which is fitted a bushing, g^5 , the said bushing being clamped in place in the casting, as shown, by a tap-bolt, g^7 .

The bushing g^5 may have any desired form of opening in cross-section to adapt itself to any particular thing to be held therein.

For some particular classes of work the casting with the bushing may take the place of the work-holding turret, they being fastened to the reciprocating table at any desired point, according to the work to be done.

It is obvious that the tool-holding spindle and its supports might be reciprocated with relation to the turret by devices such as shown and described as employed to reciprocate the turret; so I do not desire to limit my invention to reciprocating the turret only; nor do I desire to limit my invention to the exact shape of the turret or the means co-operating therewith to retain the work or material to be acted upon firmly in position while subjected to the action of the tool.

I claim—

1. In a drilling-lathe, a work-holder and a rotating tool-holder, a ratchet-wheel secured to the said work-holder internally and adjacent thereto, a sliding plate carrying a pawl to engage the said wheel and rotate it automatically for a predetermined distance, combined with a cam to automatically change the relative position of the said work-holder and tool-holder, substantially as described.

2. In a drilling-lathe, the reciprocating table c' , a cam to operate it automatically, a work-holder and means, as a ratchet-wheel and pawl, to rotate it intermittently, and a locking

device to lock the said work-holder, combined with a rotating tool-holding spindle.

3. In a drilling-lathe, the reciprocating table c' , a cam to operate it automatically, the shaft b' , and differential gearing to actuate it, combined with a rotating tool-holding spindle.

4. In a lathe, the combination, with a work-holding turret, of a holder, substantially as described, co-operating therewith to retain the work in position, substantially as described.

5. In a drilling-lathe, the shafts a^4 and b^7 and the differential gearing a^7 , b^3 , b' , and b^2 ,

the gear a^7 having ratchet-teeth at its periphery, combined with means, substantially as described, to hold or release the gear a^7 , to insure the operation or stopping of the shaft b^7 , substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RIMMON C. FAY.

Witnesses:

E. D. BANCROFT,

C. E. LONGFELLOW.