

No. 732,050.

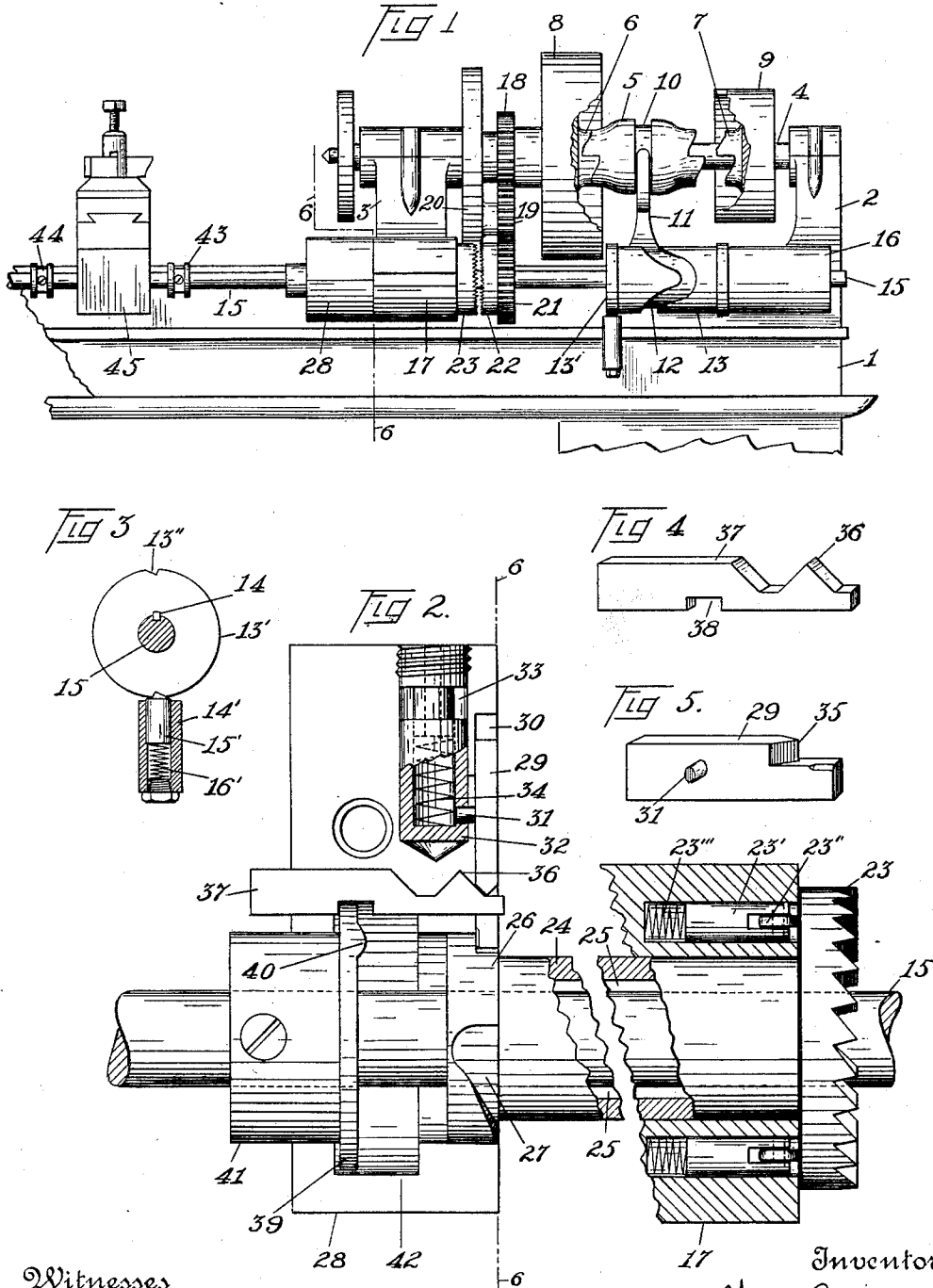
PATENTED JUNE 30, 1903.

T. CRAIG.
LATHE.

APPLICATION FILED NOV. 15, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

Chas. R. Hardt.
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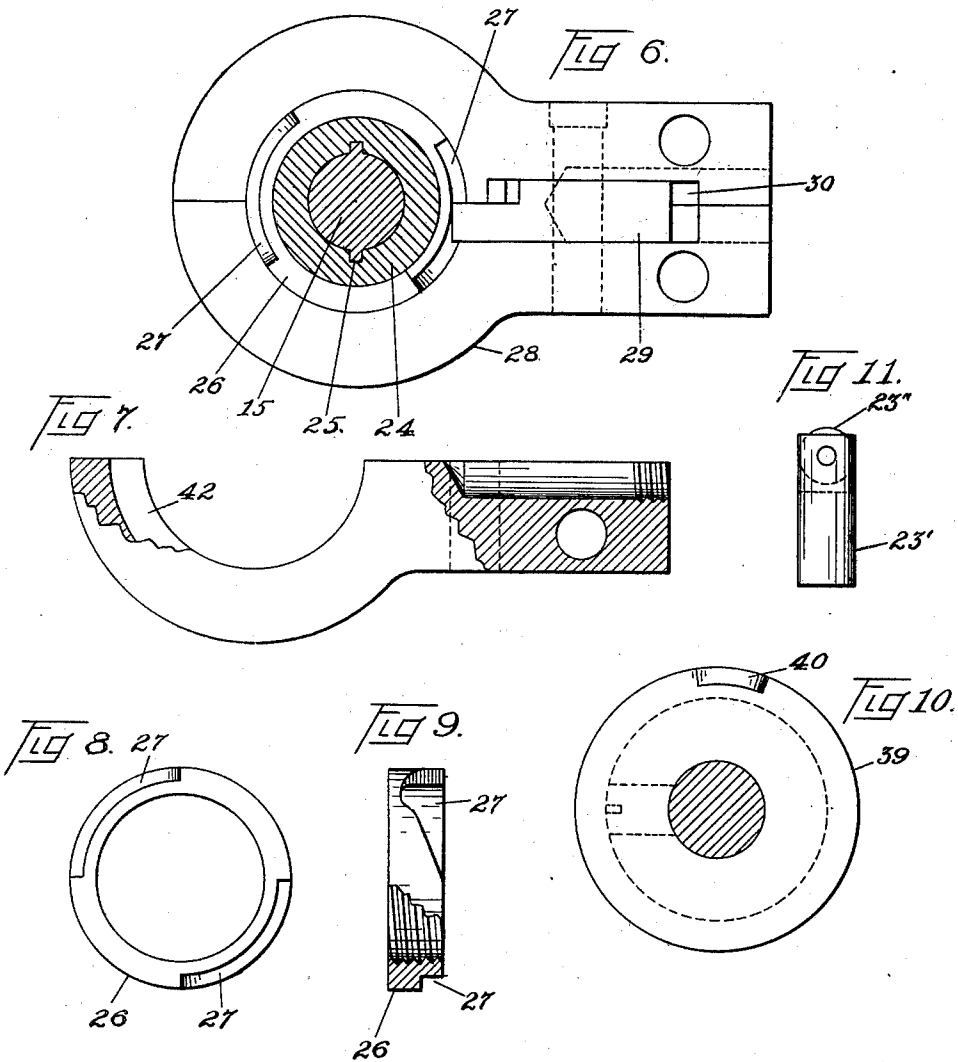
T. CRAIG.

LATHE.

APPLICATION FILED NOV. 15, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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LATHE.

SPECIFICATION forming part of Letters Patent No. 732,050, dated June 30, 1903.

Application filed November 15, 1902. Serial No. 131,481. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CRAIG, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Lathes, of which the following is a specification.

This invention relates to automatically-operated reversing mechanism for power-lathes. It is designed, primarily, to provide improved means for engaging and disengaging the clutches through which power is transmitted to the lathe, to reduce the power required for effecting the operation, and to facilitate the action of the lathe.

The nature and characteristic features of the improvements will more fully appear by reference to the following description and the accompanying drawings, of which—

Figure 1 represents an elevation of a portion of a lathe having my invention applied thereto. Fig. 2 represents a detached plan view of my improvements, parts being broken away for the purpose of illustration. Fig. 3 represents an end view of the cam-cylinder in engagement with the latch for holding the same. Fig. 4 represents a perspective view of the trip-bolt. Fig. 5 represents a perspective view of the latch-bolt. Fig. 6 represents a sectional view taken on the line 6 6 of Figs. 1 and 2. Fig. 7 represents a side elevation, partially in section, of the bearing shown in Fig. 6. Fig. 8 represents a face view of the cam-ring engaged by the latch-bolt. Fig. 9 represents a peripheral view of the same, partially in section. Fig. 10 represents a face view of the cam-ring for operating the trip-bolt, and Fig. 11 represents a view of a clutch-actuating bolt.

As shown in the drawings, the lathe-bed 1 supports the head-stock or pedestals 2 and 3, in which is journaled the shaft or spindle 4, having the clutch-sleeve 5 revolubly fixed and longitudinally movable thereon, the sleeve being moved back and forth to alternately engage and disengage the spindle with the clutching mechanisms 6 and 7 and the pulleys 8 and 9, which are driven in opposite directions and normally revolve freely on the spindle. The sleeve 5 is provided with the groove 10 for engaging the yoke 11, which engages

the cam-groove 12 of the revoluble cylinder 13. The cam-cylinder 13 is revolubly connected by a spline 14 with a shaft 15, which is revoluble and longitudinally movable in the bearings 16 and 17, the revolution of the shaft revolving the cylinder and by the engagement of its cam-groove with the yoke shifting the sleeve 5 to alternately clutch the pulleys 8 and 9 and revolve the spindle 4 backward and forward.

A disk 13', having the notches 13'' therein, is fixed on the end of the cylinder 13 and coacts with the bolt 15', which is movable in the seat 14' and pressed upward by the spring 16' to stop the cam-cylinder.

A pinion 18 on the spindle 4 is fixed to the revolving wheel 8 and engages with an idle pinion 19, journaled on a fixed bearing 20, the pinion 19 engaging a pinion 21, which has a clutch-ring 22 fixed thereto and runs free on the shaft 15. A clutch-ring 23, adapted to engage the ring 22, is fixed to a sleeve 24, which is longitudinally movable on the shaft 15, but revolubly fixed thereto by the splines 25, the sleeve being revoluble and longitudinally movable in the bearing 17. The clutching device 23 when the sleeve 24 is released is thrown into engagement with the clutching device 22 by the plungers or bolts 23', which have thereon the friction-rollers 23'' and are actuated by the springs 23''', these parts being carried by the bearing 17. A ring 26, provided with the peripheral grooves or camways 27, is fixed on the end of the sleeve 24 and revolves in a fixed bearing 28, which is suitably supported by the head-stock. A latch-bolt 29, adapted to reciprocate in the way 30, is normally held in engagement with the periphery of the ring 26 and the recesses 27 therein by the engagement of its pin 31 with a plunger 32, the latter being adapted to reciprocate in the way 33 under the control of the spring 34. The bolt 29 is withdrawn and the sleeve 24 released by the engagement of the wedge-shaped shoulder 35 on the bolt with the wedge 36 on the trip-bolt 37, which is adapted to reciprocate in the bearing 28. The bolt 37 is reciprocated by the engagement of its notch 38 with a ring 39 and a cam 40 thereon, the ring being fastened to the

shaft 15 by the hub 40 and being permitted to reciprocate therewith by the recess 42 in the bearing 28. On the shaft 15 are fixed the adjustable stops or rings 43 and 44, which

are set to be engaged by the tool-holder 45, supported and moved in the usual manner when it has been moved in either direction to the point where it is desired to reverse.

It will now be understood that when the traveling tool-carrier 45 strikes the ring 43 the shaft 15 is thereby moved longitudinally in its bearings and also in the cylinder 13 and the sleeve 24. The ring 39, moving with the shaft, causes the trip-bolt 37 by the engagement of the wedge 36 with the wedge 35 to lift the latch-bolt 29 out of engagement with the recess 27 of the ring 26. The sleeve 24 being thus released, the spring-pressed bolts 23' then throw the sleeve and cause the clutch-ring 23 thereon to engage the revolving clutch-ring 22, driven by its geared connection with the revolving pulley 8. As the sleeve 24 is connected by the splines 25 with the shaft 15, the sleeve revolves the shaft and the ring 39 thereon; thus causing the cam 40 to engage the notch 38 and effect the complete throw of the bolt 37, by which the shoulder 36 is carried past the shoulder 35, so that the bolt 29 is free to drop into the advancing cam-groove 27. At the same time the cam-cylinder 13 is revolved by the shaft 15 through the spline connection 14, and the cam-groove 12, acting through the yoke 11, causes the clutch member 5 to disengage the clutch member 6 and engage the clutch member 7. The clutch member 5 being revolubly fixed on the spindle 4 and now engaged with the pulley 9, simultaneously with the withdrawal of the clutch-ring 23 from the clutch-ring 27 by the engagement of the bolt 29 with the cam 27, the revolution of the spindle 4 is reversed by the pulley 9, which runs in the reverse direction to pulley 8. Upon the completion of the operation of shifting the sleeves 5 and 24 at the end of the half-revolution of the shaft 15 the bolt 15' engages a notch 13" of the disk 13' and checks the shaft and the mechanism revolubly fixed thereon. The tool-carriage 45 is now moved in the opposite direction in any desired manner, as by the usual screw revolved by gearing connected with the shaft 4, until it strikes the ring 44, by which the shaft 15 is moved longitudinally in the opposite direction and the reversing mechanism again released.

Having described my invention, I claim—

1. The combination of a revoluble and longitudinally-movable shaft, with a clutching device revolubly free thereon, a clutching device revolubly fixed and longitudinally movable on said shaft, mechanism operated by the longitudinal movement of said shaft for releasing said second clutching device and permitting it to engage said first clutching device, and mechanism for automatically disengaging said clutching devices, substantially as specified.

2. The combination of a revoluble and longitudinally-movable shaft, with a clutching device revolubly free thereon, a clutching device revolubly fixed and longitudinally movable on said shaft, mechanism connected with said second clutching device for automatically effecting its engagement with said first clutching device, and mechanism connected with said second clutching device for automatically effecting its disengagement from said first clutching device, substantially as specified.

3. The combination of a revoluble and longitudinally-movable shaft, with a clutching device revolubly free thereon, a clutching device revolubly fixed and longitudinally movable on said shaft, a cam connected with said second clutching device, and mechanism co-acting with said cam for moving said second clutching device, substantially as specified.

4. The combination of a revoluble and longitudinally-movable shaft, with a clutching device revolubly free thereon, a clutching device revolubly fixed and longitudinally movable on said shaft, a cam connected with said second clutching device, a reciprocating member adapted to engage said cam, and mechanism connecting said shaft and reciprocating member, whereby said shaft effects the reciprocation of said member, for the purpose specified, substantially as set forth.

5. The combination of a revoluble and longitudinally-movable shaft, with a clutching device revolubly free thereon, a clutching device revolubly fixed and longitudinally movable on said shaft, a cam connected to and revolving with said second clutching device, a reciprocating bolt adapted to engage and disengage said cam, and a second reciprocating bolt for operating said first bolt, substantially as specified.

6. The combination of a revoluble and longitudinally-movable shaft, with a clutching device revolubly free thereon, a clutching device revolubly fixed and longitudinally movable on said shaft, a cam connected to and revolving with said second clutching device, a reciprocating bolt adapted to engage and disengage said cam, a reciprocating trip for operating said bolt, and mechanism connecting said shaft with said trip for reciprocating the same, substantially as specified.

7. The combination of a ring having a camway therein, with a reciprocating bolt adapted to engage and disengage said camway, a second reciprocating bolt for operating said first bolt, and mechanism for reciprocating said second bolt, substantially as specified.

8. The combination of a revoluble and longitudinally-movable shaft, with a pinion revoluble thereon, gearing for operating said pinion, a clutching device revoluble on said shaft and connected with said pinion, a sleeve carrying a clutching device revolubly fixed and longitudinally movable on said shaft, a camway carried by said sleeve, a reciprocating bolt adapted for engaging and disengag-

ing said cam way, and mechanism operated by said shaft for withdrawing said bolt from said camway, substantially as specified.

9. The combination of a revoluble and longitudinally-movable shaft, with a pinion revoluble thereon, gearing for operating said pinion, a clutching device revoluble on said shaft and connected with said pinion, a sleeve carrying a clutching device revolubly fixed and longitudinally movable on said shaft, a plurality of camways carried by said sleeve, a reciprocating bolt adapted to engage and disengage said camways, and a bolt connected with and reciprocated by said shaft for operating said first bolt, substantially as specified.

10. The combination of a revoluble wheel, a clutching device connected therewith, a revoluble shaft and a clutching device thereon, gearing connecting said wheel with the clutching device on said shaft, a cam on said shaft, and mechanism connecting said cam with said first clutching device, substantially as specified.

11. The combination of a revoluble shaft, with a wheel revoluble thereon, a clutch for engaging the wheel to the shaft, a gear-train operated by the wheel, a second revoluble shaft, a pinion of the gear-train loose on the second shaft, a clutch for engaging the pinion to the second shaft, a cam revolubly fixed on the second shaft and connected with the first clutch, and mechanism for automatically engaging and disengaging the second clutch, for the purpose specified, substantially as set forth.

12. The combination of a revoluble spindle, a revoluble shaft, mechanism comprising a gear-train connecting said spindle and shaft, mechanism operated by the longitudinal movement of said shaft for engaging said shaft and gear-train, and mechanism for automatically disengaging said shaft and gear-train, substantially as specified.

13. The combination of a revoluble spindle, mechanism comprising a train of gears connected therewith, a revoluble and longitudinally-movable shaft, a carriage adapted to move said shaft longitudinally, mechanism operated by the longitudinal movement of said shaft for engaging said shaft and gears, and mechanism for disengaging said shaft and gears, substantially as specified.

14. The combination of a revoluble spindle, a wheel thereon, a clutching device adapted for engaging and disengaging said wheel and spindle, a revoluble shaft, a train of gears connecting said wheel and shaft, mechanism adapted for engaging and disengaging said

gears and shaft, a cam revolubly fixed on said shaft, and mechanism connecting said cam and clutching device for operating the latter, substantially as specified.

15. The combination of a revoluble spindle, a wheel thereon, a clutching device adapted for engaging and disengaging said wheel and spindle, a revoluble and longitudinally-movable shaft, a train of gears connecting said wheel and shaft, a clutching device adapted for engaging and disengaging said gears and shaft, mechanism for moving said shaft longitudinally and effecting the engagement of said second clutching device, a cam revolubly fixed on said shaft, mechanism connecting said cam and said first clutching device, and mechanism for releasing said second clutching device when said shaft has revolved a predetermined distance, substantially as specified.

16. The combination of a revoluble and longitudinally-movable shaft, a cam-cylinder revoluble therewith, stop mechanism adapted to engage and check said cylinder at a predetermined point in its revolution, driving mechanism adapted for engaging and revolving said shaft, and mechanism adapted for moving said shaft longitudinally to engage said driving mechanism therewith, substantially as specified.

17. The combination of a revoluble and longitudinally-movable shaft, a cam revolubly fixed and longitudinally movable thereon, driving mechanism adapted to be connected with said shaft for revolving the same, a reciprocating device adapted to engage said cam and thereby disengage said driving mechanism, and mechanism operated by the longitudinal movement of said shaft for disengaging said device and engaging said driving mechanism, substantially as specified.

18. The combination of a revoluble and longitudinally-movable shaft, a cam revolubly fixed and longitudinally movable thereon, a reciprocating bolt adapted to engage said cam and move the same longitudinally on said shaft, a second bolt connected with said shaft and moved longitudinally thereby to withdraw said first bolt from said cam, and mechanism for moving said cam longitudinally on said shaft, substantially as specified.

In testimony whereof I have hereunto set my hand, this 14th day of November, 1902, in the presence of the subscribing witnesses.

THOMAS CRAIG.

Witnesses:

THOMAS S. GATES,
ROBT. F. SCOTT.