Dec. 11, 1923. 1,477,480

W. F. GROENE

COMBINED POWER AND HAND OPERATED FEED MECHANISM

Filed Aug. 2, 1920 2 Sheets-Sheet 1

Fig. 1

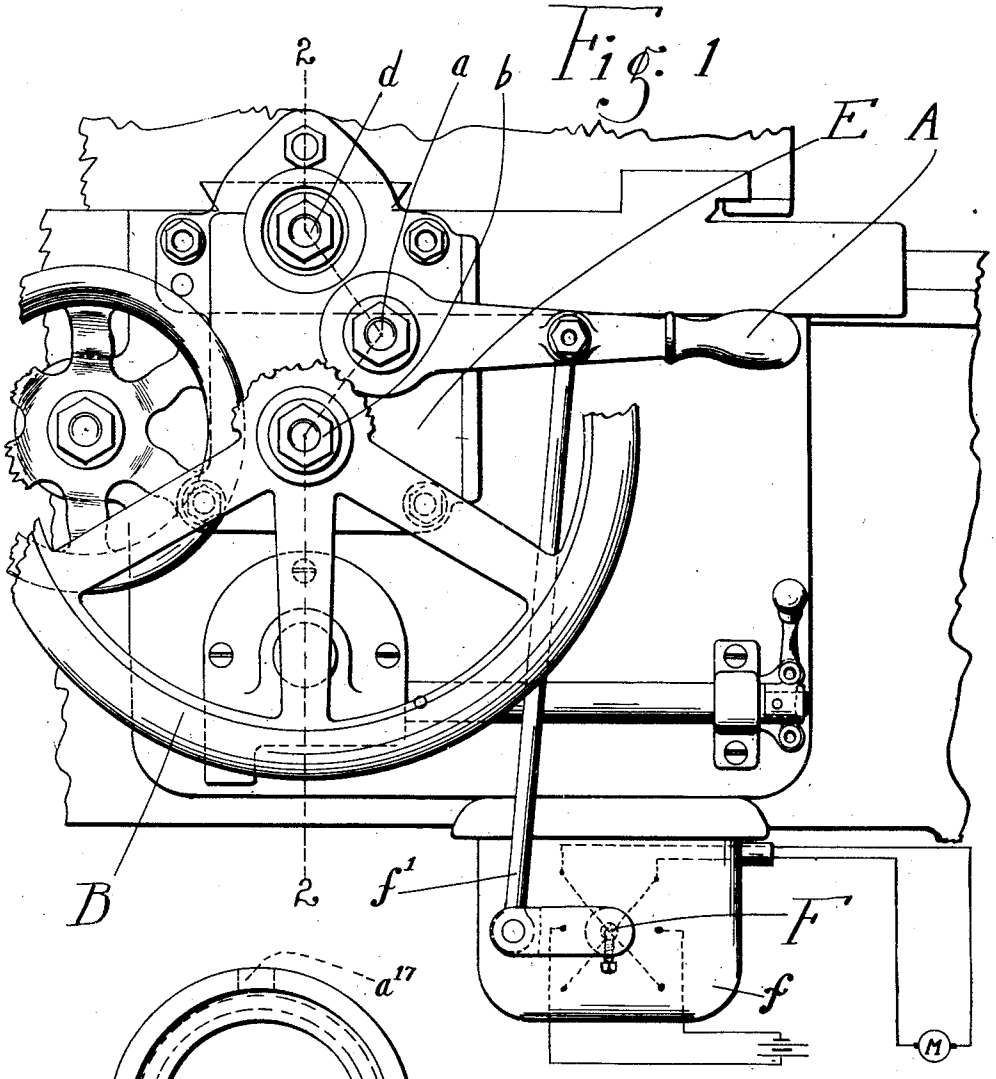
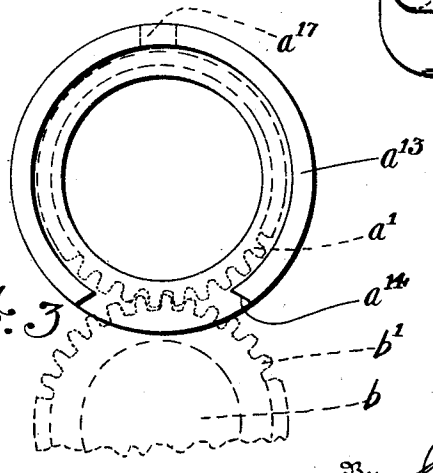


Fig. 3



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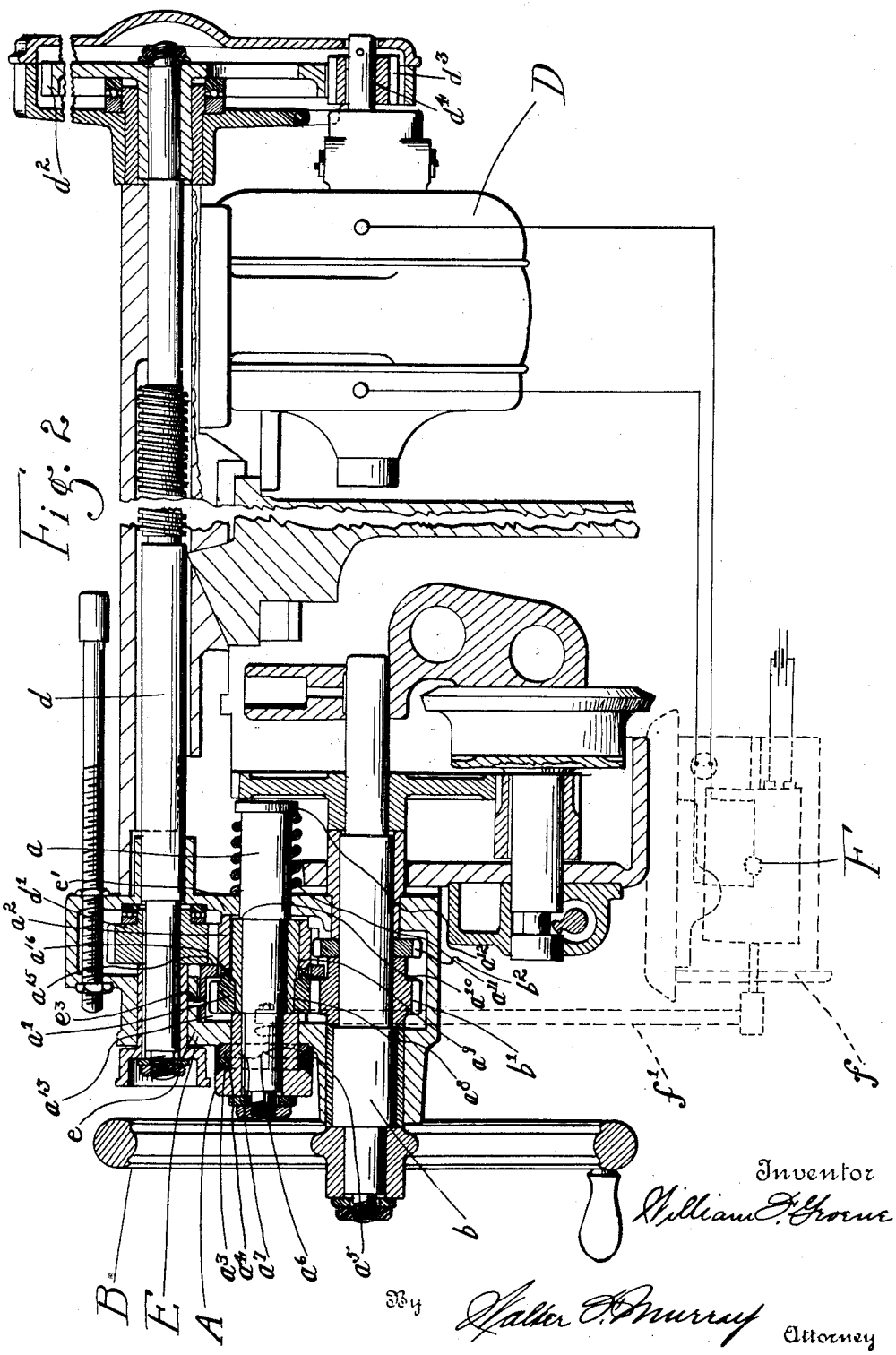

Fig. 2.

Patented Dec. 11, 1923. 1,477,480

UNITED STATES PATENT OFFICE.

WILLIAM F. GROENE, OF CINCINNATI, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE R. K. LEBLOND MACHINE TOOL COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF DELAWARE.

COMBINED POWER AND HAND OPERATED FEED MECHANISM.

Application filed August 2, 1920. Serial No. 400,611.

To all whom it may concern:

Be it known that I, WILLIAM F. GROENE, a citizen of the United States of America, and resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in a Combined Power and Hand Operated Feed Mechanism, of which the following is a specification.

An object of my invention is to provide a motor operated cross feed mechanism for advancing or withdrawing the tool rest and cutting tools used with machine tools, such as lathes, in which the operation of the lever controlling the motor will automatically disengage the hand wheel when the motor is operative. This permits the use of a pilot type hand wheel.

Another object of my invention is to provide a device for the purpose stated that is simple in construction and operation.

These and other objects are attained by the means described herein and disclosed in the accompanying drawing in which:

Fig. 1 is a fragmental front elevation of a lathe upon which a device embodying my invention has been mounted.

Fig. 2 is a sectional view on line 2—2 of Fig. 1, on a slightly reduced scale.

Fig. 3 is an enlarged end view of a slotted collar forming a detail of my invention.

I will show and describe my device as applied to the cross feed of a lathe.

The feed control lever A mounted upon the feed control lever shaft a is adapted to disengage the reciprocating or slidable clutch gear a' and the fixed or stationary clutch gear a^2 when moved from a neutral or normal position. The reciprocating gear meshes with the hand wheel shaft gear b' mounted on the hand wheel shaft b upon which the hand wheel B is mounted. The stationary clutch gear a^2 meshes with the cross feed shaft gear d' mounted on the cross feed screw shaft d that is driven by the motor D. Therefor when the gears a' and a^2 engage, power from the hand wheel is transmitted to the shaft d and when disengaged the hand wheel cannot be moved by the shaft d. The cross feed control lever A is mounted upon the feed control lever shaft a and has a collar cam a^3 fixedly mounted upon the sleeve a^7 formed on the lever A. The collar a^4 having a cam seat a^5 in which the cam a^6 on the cam collar a^3 normally engages, is mounted on the sleeve a^7 adjacent to the collar cam a^3 and is fixed to the apron E. The sleeve a^7 extends thru the front wall e of the apron E and abuts the collar bearing a^8 mounted on the shaft a and upon which the gears a' and a^2 are mounted. The sleeve also abuts the gear a'. A shoulder a^9 formed on the collar bearing a^8 abuts the gear a' opposite to the abutement of the sleeve a^7 thereupon. A shoulder a^{10} formed on the shaft a abuts the collar bearing a^8 opposite to the abutment of the sleeve a^7 thereupon. The shaft a adjacent to the shoulder a^{10} extends thru the rear wall e' of the apron E and has mounted upon it the spring a'' one end of which abuts the wall e' and the other end of which abuts the flange a^{12} formed on the end of the shaft a. The slotted collar a^{13} substantially encases the reciprocating gear a' and is secured to the apron E by means of the pin e^3 engaging in perforation a^{17} in the top of the collar a^{13}. The slot a^{14} in the collar a^{13} is disposed adjacent to the gear b' mounted on the shaft b whereby the gears a' and b' may engage one another. An inwardly turned flange a^{15} on the collar a^{13} engages the shoulder a^{16} formed on the gear a^2 whereby the gear a^2 is fixedly retained between said collar and the wall e' of the apron. The flange a^{15} on the collar a^{13} also abuts the gear d' fixedly mounted on the shaft d, said gear d' engaging the gear a^2.

The hand wheel B is mounted on the hand wheel shaft b extending thru the apron E and having mounted upon it the hand wheel shaft gear b' engaging the reciprocating clutch gear a'. An idler gear b^2 is mounted on shaft b and engages the stationary clutch gear a^2.

The cross feed shaft d' is mounted on the cross feed shaft d upon which the motor transmission gear d^2 engaging the gear d^3 is mounted; the motor shaft gear d^3 being mounted on the motor shaft d^4 of the motor D.

A three-way pole changing or reversing switch F encased within the housing f is operated by means of the rod f' attached at one end to the lever A. When the lever A is in a normal or neutral position the circuits in which the motor D is interposed are open. When the lever A is

moved in either a clockwise or counter-clockwise direction from the neutral position, a circuit embracing the motor D is closed, one circuit causing the motor to operate in a given or forward direction, and the other circuit reversing the rotation of the motor.

The operation of my device is as follows:

When it is desired to drive the cross feed shaft by means of the motor the lever A is moved to either a forward or reverse position, as the case may be. Simultaneously with the closing of the switch, by means of the rod f', the cam a^6 upon the cam collar a^3 is dislodged from its seat in the collar a^4 due to the movement of shaft a, thereby moving the feed control lever shaft a forward, or toward the hand wheel B. As the shaft a moves in this direction the shoulder a^{10} of the shaft a moves the collar bearing a^8, abutting against the gear a', toward the hand wheel B thereby disengaging gears a' and a^2 that serve as the driving and driven members respectively of a clutch. The motor D therefor operates upon the tool carriage, not shown, by means of the gears d^3 and d^2, without actuating the hand wheel B. When the tool is approximately positioned by means of this rapid transverse feed, the lever A is moved to a neutral position. The spring a'' then returns the parts to their normal positions. The shaft b upon which the hand wheel B is mounted is then employed to feed the tool rest. The rotary motion of shaft b is transmitted to shaft d by means of the gear b' engaging the gear a' and gear a' engaging gear a^2 which in turn engages gear d' mounted upon the shaft d. The idler b^2 is mounted on the shaft b and meshes with the gear a^2, serving as a support, thereby avoiding excess wear upon the gear a^2. The slotted collar a^{13} serves as an abutment against the gear a^2.

What I claim is:

1. The combination of a feed shaft, a feed shaft gear on the shaft, a motor operative upon the shaft, a switch in the motor circuit, a hand wheel shaft, a hand wheel mounted on the hand wheel shaft, a hand wheel shaft gear mounted on the hand wheel shaft, a feed control shaft, a feed control lever mounted on the control shaft and adapted to operate the switch, and a clutch on the control shaft adapted to be actuated by the control lever and normally having its driving and driven members in engagement, said driving and driven members engaging the hand wheel shaft gear and the feed shaft gear respectively.

2. The combination of a feed shaft, a feed shaft gear on the shaft, a motor operative upon the shaft, a switch in the motor circuit, a hand wheel shaft, a hand wheel mounted on the hand wheel shaft, a hand wheel shaft gear mounted on the hand wheel shaft, a feed control shaft, a feed control lever mounted on the control shaft and adapted to operate the switch, a clutch operative upon the gears, and means mounted on the feed control shaft adapted to yieldingly hold the clutch members in their normal positions.

3. The combination with a feed shaft, of a motor operative upon the feed shaft, a hand wheel normally operative upon the feed shaft, a normally open switch in the motor circuit, a lever adapted to disconnect the hand wheel and feed shaft, and a rod mounted on the lever and adapted to close the switch.

4. The combination with a feed shaft, of a motor operative upon the feed shaft, a normally open switch in the motor circuit, a hand wheel, a clutch having its driving and driven members normally in engagement, means to transmit the movement of the driving and driven members of the clutch to the hand wheel and feed shaft respectively, means to disengage the clutch members, and means to close the switch simultaneously with the disengagement of the clutch members.

5. The combination with a feed shaft having a power operated means operative upon the shaft, of a feed shaft gear mounted on the shaft, a hand wheel shaft, a hand wheel and a hand wheel shaft gear mounted on the last mentioned shaft, a feed control shaft, a clutch on the feed control shaft and having its driving and driven members in driving engagement with the gears on the hand wheel shaft and the feed shaft respectively, and a control lever mounted on the feed control shaft and adapted to simultaneously cause the power means to operate upon the feed shaft and to disconnect the driving and driven members of the clutch.

6. The combination with a feed shaft having a power operated means operative upon the shaft, of a feed shaft gear mounted on the shaft, a lever control shaft, a shoulder on the control shaft, a collar bearing mounted on the control shaft and abutting the shoulder, a shoulder on the bearing, a fixed gear revolubly mounted on the collar bearing and feed shaft gear, a second gear mounted on the collar bearing and abutting the shoulder on the bearing, a control lever mounted on the control lever shaft, a sleeve on the lever abutting the collar bearing and the second mentioned gear mounted on the collar bearing, a fixed collar slidably mounted on the sleeve and having a cam seat therein, a cam collar fixedly mounted on the sleeve, a cam on the cam collar normally engaging in the cam seat referred to, the gears on the collar bearing being normally adapted to engage, yielding means adapted normally to return the parts to their normal positions, a manually operated gear engag-

ing the second mentioned gear on the collar bearing, and means causing the power operated means to operate the feed shaft when the cam is unseated.

7. A transmission device comprising an apron having a front and rear wall, a control shaft extending thru the apron walls and having a shoulder thereon, a flange on the shaft, a control lever mounted on the control shaft, a sleeve on the lever extending thru the front apron wall, a collar having a cam seat mounted on the sleeve and affixed to the front apron wall, a cam collar fixedly mounted on the sleeve, a cam on the cam collar normally engaging in the cam seat, a collar bearing mounted on the control shaft and having its ends abutting the shoulder on the control shaft and the sleeve, a shoulder on the collar bearing, a slidable gear mounted on the collar bearing and abuting the shoulder on the bearing and the sleeve, a slotted collar secured to the apron and substantially encasing the slidable gear, a fixed gear mounted slidably upon the collar bearing and abutting the rear wall of the apron and the slotted collar, a spring mounted on the control shaft and abutting the rear wall of the apron and the flange on the control shaft, the gears being adapted to transmit motion to one another when in engagement, both gears being adapted to engage gears mounted on adjacent shafts.

8. The combination with a feed shaft, of a hand wheel normally operative on the shaft, a reversible motor mechanism operable upon the shaft and normally inoperative, and means for selectively actuating the motor mechanism and for simultaneously disconnecting the hand wheel.

9. The combination of a feed shaft, a manually operative means adapted to actuate the feed shaft, an electric motor in driving engagement with the feed shaft, an electric circuit adapted to embrace the motor, and means to simultaneously close the electrical circuit and disengage the manually operative means from the feed shaft.

In witness whereof, I have hereunto subscribed my name this 28th day of July, 1920.

WILLIAM F. GROENE.