

B. D. JACKSON.
MICROMETER FEED FOR TOOLS.
APPLICATION FILED NOV. 7, 1912.

1,084,014.

Patented Jan. 13, 1914.

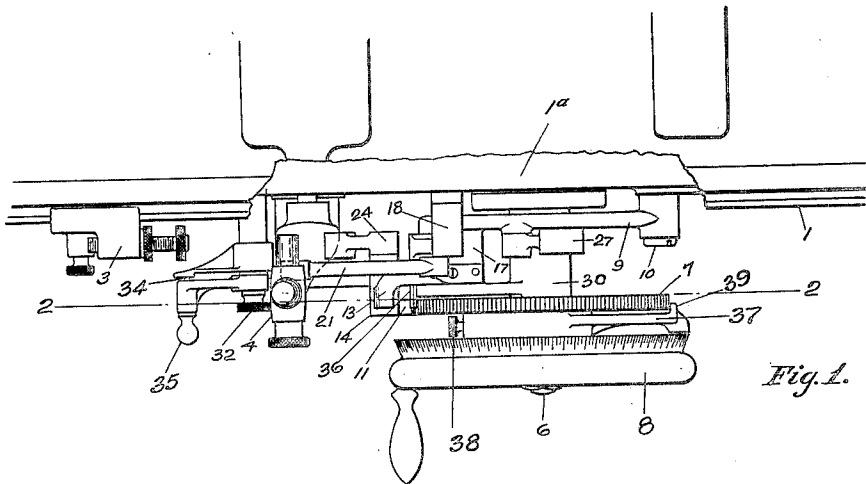


Fig. 1.

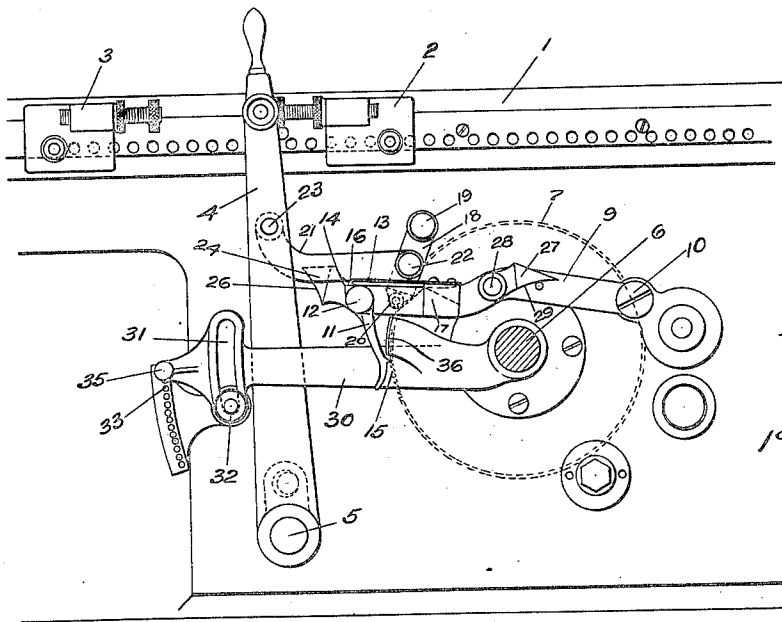
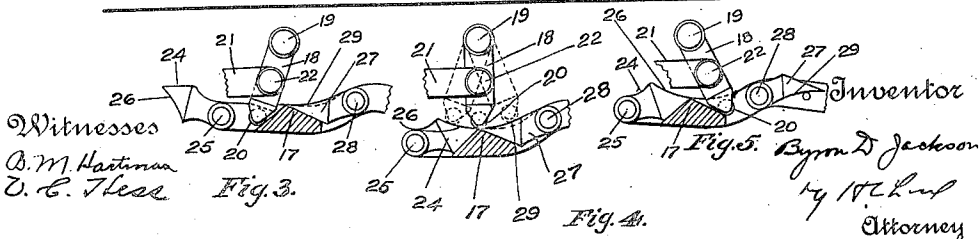


Fig. 2.



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Fig. 3.

Fig. 4.

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MICROMETER-FEED FOR TOOLS.

1,084,014.

Specification of Letters Patent.

Patented Jan. 13, 1914.

Application filed November 7, 1912. Serial No. 730,095.

To all whom it may concern:

Be it known that I, BYRON D. JACKSON, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Micrometer-Feeds for Tools, of which the following is a specification.

This invention relates to micrometer feeds for tools and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

The invention is particularly designed for use on grinding machines and as shown is arranged in connection with the cross feed shaft of a grinding machine.

The object of the device is to provide an automatic feed which may be adjusted with minute variations to adapt the device to varying classes of work.

The invention is illustrated in the accompanying drawings as follows:—

Figure 1 shows a plan view of the device. Fig. 2 a vertical section on the line 2—2 in Fig. 1. Figs. 3, 4 and 5 details of the pawl actuating mechanism, the three figures showing three different adjustments of this mechanism.

1 marks the carriage. 1^a the frame on which the carriage operates. These are of any ordinary construction. The carriage is provided with the adjustable carriage stops 2 and 3. These operate on the reversing lever 4, the reversing lever being fixed on the reversing shaft 5. The reversing mechanism is not shown. It will be understood that any of the ordinary reversing mechanisms may be used. The feed shaft 6 is journaled in the frame 1^a and is connected with the cross feed by any of the well-known mechanisms suitable to be actuated by the feed shaft. The feed ratchet wheel 7 is fixed on the shaft 6 and a hand wheel 8 is also fixed on this shaft. Both the devices, the ratchet wheel and the hand wheel are of a construction now in use.

The pawl lever 9 is pivoted by means of a pin 10 on the frame 1^a. It carries the feed pawl 11. It is adapted to operate on the ratchet wheel 7. The pawl is swingingly mounted on the lever 9 by means of a pin 12. The pawl is yieldingly pressed into engagement with the wheel 7 by means of a spring 13, the spring pressing on a small pointed

arm 14. When the spring is arranged on the top of this arm the pawl is forced into engagement with the teeth 15 of the wheel but the pawl may be drawn out against the force of this spring and the point drawn back of the downward extension 16 on the spring and in this way the pawl may be locked out of position to engage the teeth.

A double cam commonly called an arrow point 17 is arranged on the pawl lever 9, and a swinging lever 18 operates on this arrow point 17 to actuate the pawl lever 9. The lever 18 is pivoted on the pin 19, the pin extending into the frame 1^a and is provided with the roller 20 to facilitate its action on the cam surfaces of the arrow point 17. It will be noted that as the lever 18 is oscillated a complete movement of the pawl lever is accomplished with a movement of the oscillating lever 18 in either direction. The oscillating lever 18 is connected to a link 21 by a pin 22 and the link 21 is connected to the reversing lever 4 by a pin 23. In this manner it will be observed that with each movement of the reversing lever the oscillating lever 18 is moved.

It is sometimes desirable to have a feeding action at each end of the movement of the carriage. At other times it is desirable to have the feeding action only at one end and also desirable to be able to control the end at which the feeding action takes place. This is accomplished in this mechanism as follows:—A filling piece 24 is mounted on the pawl lever 9 by means of a pin 25. This filling piece has the surface 26, the surface when swung into the position shown in Figs. 4 and 5 being an arc of a circle with the axis of the oscillating lever as a center. Therefore, when this filling piece is thrown into the position shown in Figs. 4 and 5, the movement of the lever 18 over the surface 26 does not effect the movement of the pawl lever. On the other hand, if this filling piece 24 is thrown out of the position on the cam surface of the arrow point 17 as shown in Fig. 3 the roller 20 will follow down the cam surface of the arrow point and will effect a movement of the pawl lever. A filling piece 27 is mounted on a pin 28 on the pawl lever and has the surface 29 which is similar to the surface 26. This filling piece 27 when thrown to the position shown in Figs. 3 and 4 will prevent a movement of the pawl lever by reason of the movement of

the oscillating lever 18 on that side of the arrow point. On the other hand, if this filling piece 27 is thrown to the position shown in Fig. 5 then the oscillating lever will follow down the cam surface and effect a movement of the pawl lever. Thus, it will be seen that with the filling pieces as shown in Fig. 3 there will be a movement at one end of the carriage. With the filling pieces as shown in Fig. 4 there will be no feeding movement. With the filling pieces as shown in Fig. 5 there will be a movement at the opposite end of the carriage from that shown in Fig. 3. With both the filling pieces thrown back as shown in Fig. 2 there will be a feeding movement with a reversing movement at each end of the carriage. It is also desirable to control the amount of feed with each operation of the feed wheel. To accomplish this I have provided the following mechanism:—A lever 30 is pivoted on the feed shaft 6. It has the circumferential slot 31 in its outer end through which extends a screw 32. The purpose of the screw is to lock the lever in different positions of adjustment. I prefer also to provide an adjustable plate with a series of perforations 33 which are traversed by the end of the lever 30. The pin 34 is slidably mounted in the end of the lever 30 and is adapted to enter the perforations 33. The pin 34 is provided with the knob 35 so that it may be readily actuated. With these two devices, that is, the screw 32 and the pin 34, the lever 30 may be more readily and quickly varied in its position. A pawl plate 36 is carried by the lever 30. When the lever is in its upper position as shown in Fig. 2, this pawl plate just clears the pawl 11 with the lever 30 is lowered carrying the pawl plate 36 downwardly the pawl plate is carried into the path of the pawl 11 as it moves upwardly and, therefore, the pawl in the upper part of its travel will slide on the pawl plate 36. On the downward or feeding movement of the pawl lever a part of this movement is taken up by this sliding movement of the pawl on the pawl plate and thus the effective movement of the pawl is to that extent reduced. With the pawl plate in its extreme lower position the pawl is retained out of position to engage the teeth throughout its entire travel. It will be readily seen that by adjusting the lever 30 to the various intermediate positions the amount of feed may be accurately adjusted. It is also desirable in devices of this kind to provide an automatic means for throwing out the feeding mechanism at a pre-determined point so that a number of pieces may be automatically ground to size. I have provided the mechanism for accomplishing this as follows:—An arm 37 is arranged on the shaft 6 between the wheels 7 and 8. It is provided

with a thumb screw 38 by means of which it may be secured in different positions. It is provided with a lockout plate 39 which as shown extends slightly over the face of the ratchet wheel 7. It does not, however, extend over the face of the wheel 7 a sufficient distance to engage the pawl plate 36. As seen in Fig. 1 the pawl 11 is of a width extending substantially across the face so that the pawl is engaged by either the pawl plate 36 or by a lockout plate 39. The arm 37 and with it the lockout plate 39 are set to the desired point to give to the wheel 7 the amount of feed desired. When the lockout plate 39 reaches the position traversed by the pawl 11 it swings in between the pawl and the wheel and thus prevents the pawl engaging with the feed wheel. This action on the pawl is a gradual one reducing the last few feeds until it is finally thrown out. This is desirable in that it is advantageous to have the finishing cuts of the grinding operation slightly reduced so as to get exactness of operation.

What I claim as new is:—

1. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a pawl operating on the ratchet wheel to effect the feed; an arrow point cam for actuating the pawl; a tool carriage; a reciprocating part actuated by the carriage and operating on said arrow point cam for actuating the pawl; and devices for throwing out of action one of the cam surfaces of the arrow point cam.

2. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a pawl operating on the ratchet wheel to effect the feed; an arrow point cam for actuating the pawl; a tool carriage; a reciprocating part actuated by the carriage and operating normally on the arrow point cam for actuating the pawl; and a swinging filling piece adapted to be thrown over one surface of the arrow point cam and having a surface coinciding with the path of movement of the reciprocating part.

3. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a pawl lever; an arrow point cam on the pawl lever; an oscillating lever operating on the arrow point cam; means for actuating the oscillating lever from the carriage; filling pieces adapted to be swung over the cam surfaces of the arrow point cam, said filling pieces having surfaces in the form of arcs of circles with the axis of the oscillating lever as a center; and a pawl carried by the pawl lever and operating on the ratchet wheel.

4. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a ratchet pawl operating on said wheel; means for actuating the pawl; a normally stationary pawl plate arranged in the

path of the pawl to limit its action on the wheel; and means for adjusting the plate to vary the action of the pawl on the wheel.

5. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a ratchet pawl operating on said wheel; means for actuating the pawl; a normally stationary pawl plate arranged in the path of the pawl to limit its action on the wheel; a lever carrying the plate journaled with the axis of the feed shaft as an axis; and means for adjusting the lever to different position to adjust the pawl plate.

6. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a ratchet pawl operating on said wheel; means for actuating the pawl; a normally stationary pawl plate adapted to be thrown into the path of the pawl to limit its action on the wheel; a lever carrying the plate journaled with the axis of the feed shaft as an axis; and an adjusting device for the lever comprising a perforated plate and a pin carried by the lever adapted to operate in connection with the perforated plate to lock the lever in various positions.

7. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a ratchet pawl operating on said wheel; means for actuating the pawl; a normally stationary pawl plate adapted to be thrown into the path of the pawl to limit its action

on the wheel; means for adjusting the plate to vary the action of the pawl on the wheel; and a lockout plate adjustably mounted to travel with the ratchet wheel and adapted to lock the pawl out of action at a pre-determined point in the travel of the ratchet wheel.

8. In a micrometer feed for tools, the combination of a feed shaft; a ratchet wheel on the shaft; a ratchet pawl operating on said wheel; means for actuating the pawl; a normally stationary pawl plate adapted to be thrown into the path of the pawl to limit its action on the wheel; means for adjusting the plate to vary the action of the pawl on the wheel; and a lockout plate adjustably mounted to travel with the ratchet wheel and adapted to lock the pawl out of action at a pre-determined point in the travel of the ratchet wheel, said lockout plate and pawl plate extending over a part of the surface of the ratchet wheel to permit the passage of the lockout plate past the pawl plate.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

BYRON D. JACKSON.

Witnesses:

B. M. HARTMAN,
H. C. LORD