(No Model.) 3 Sheets—Sheet 1.

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LATHE.

No. 521,754. Patented June 19, 1894.

Fig. 1.

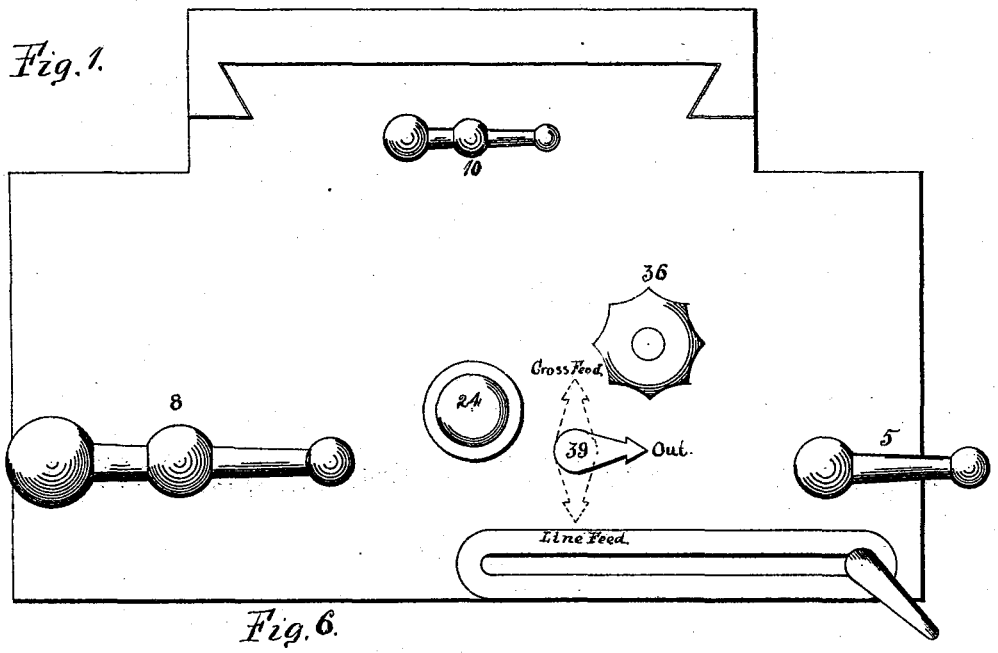
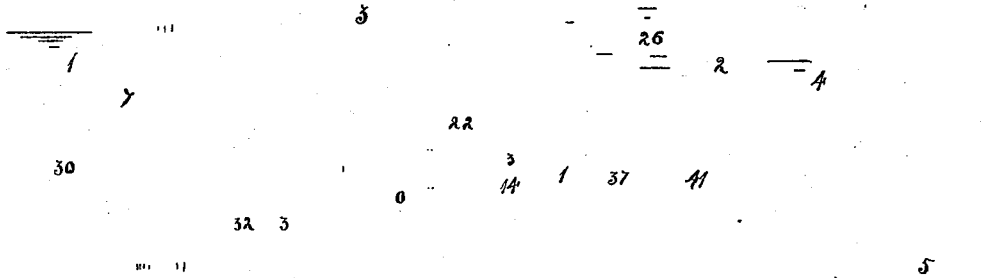


Fig. 6.



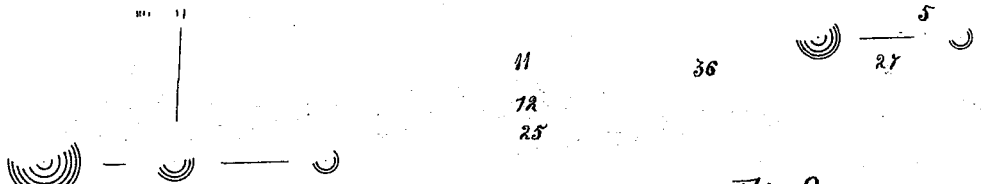


Fig. 7.

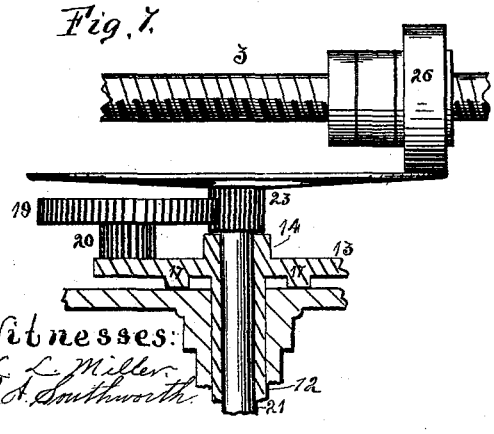


Fig. 8.

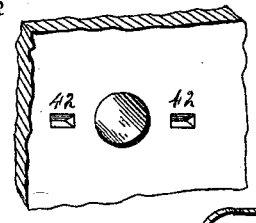
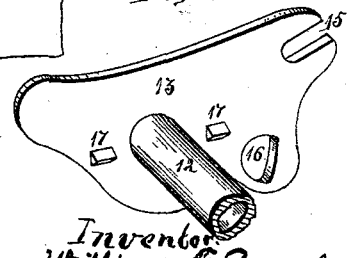


Fig. 9.



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No. 521,754. Patented June 19, 1894.

Fig. 2.

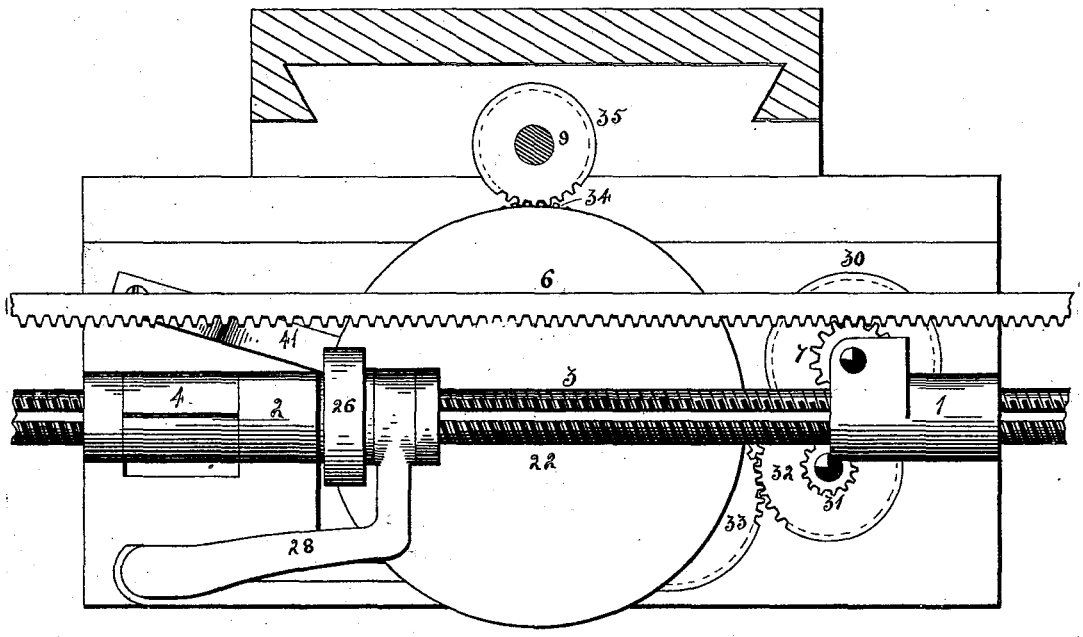
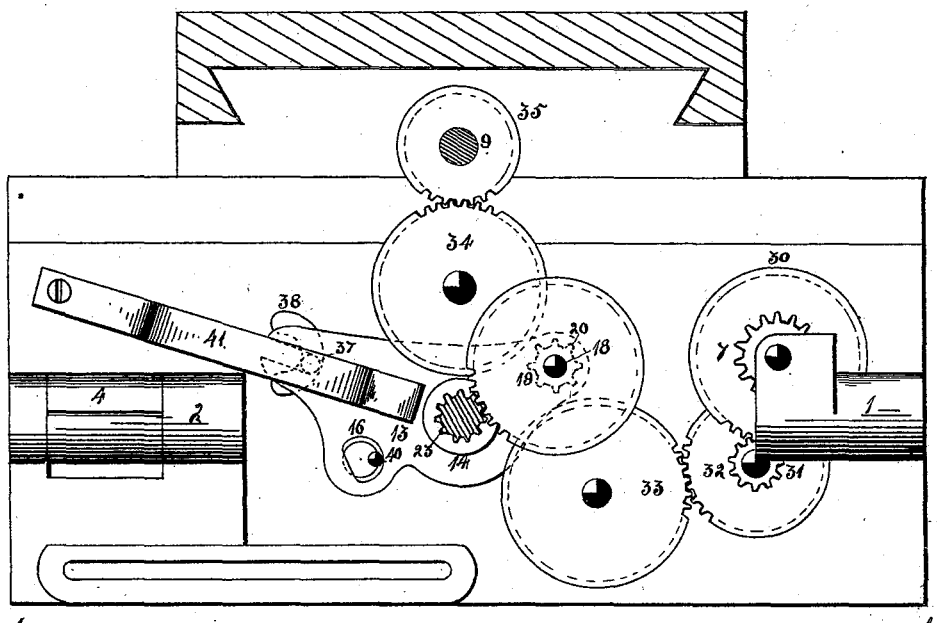


Fig. 3.



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LATHE.

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Fig. 4.

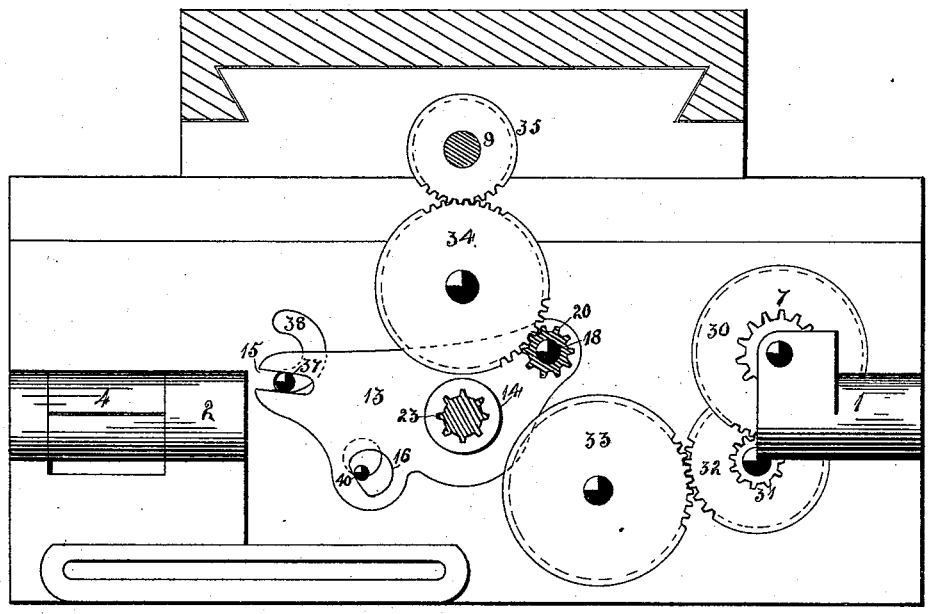
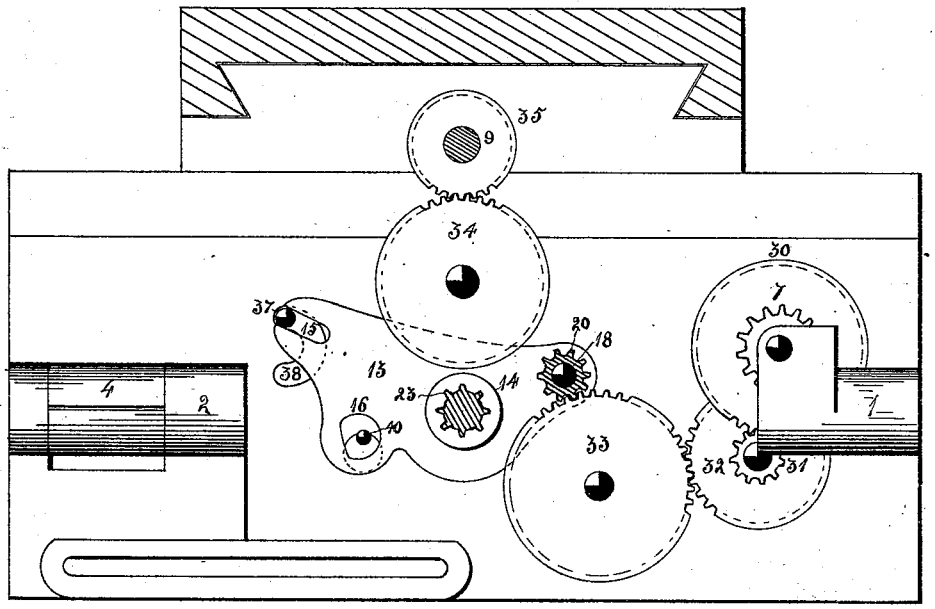


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM F. BARNES, OF ROCKFORD, ILLINOIS, ASSIGNOR TO THE W. F. & JOHN BARNES COMPANY, OF SAME PLACE.

LATHE.

SPECIFICATION forming part of Letters Patent No. 521,754, dated June 19, 1894.

Application filed February 17, 1892. Serial No. 421,886. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. BARNES, a citizen of the United States, residing at Rockford, county of Winnebago, and State of Illinois, have invented certain new and useful Improvements in Machine-Lathes, of which the following is a specification.

The object of this invention is to provide the apron of a lathe with frictional devices for imparting movement to the apron from the driving mechanism of the lathe for the purpose of advancing and withdrawing the cutting tool, either for the cross feed or line feed and in devices for transferring the driving power to the cross or line feeds.

In the accompanying drawings, Figure 1, is an outer face elevation of a lathe apron embodying my improvements. Fig. 2, is an inner face elevation of the apron showing the cross slide in section, and the toothed rack and driving screw in position. Figs. 3, 4 and 5 are also inner face representations of the apron in which the friction disk and wheel, toothed rack and driving screw are removed showing the driving mechanism out of engagement, in engagement with the cross feed and in engagement with the line feed respectively. Fig. 6, is a plan view of the apron showing some portions in horizontal section. Fig. 7, is a fragmental section of the frictional driving mechanism. Fig. 8, is an isometrical representation of an inner portion of the apron showing recesses which receive projections of the movable base. Fig. 9, is an isometrical representation of the base showing the projections which enter recesses in the apron frame.

The apron illustrated in the accompanying drawings can be applied to the usual make of machine lathes employing a driving screw for screw cutting or a slotted driving rod for ordinary work, also a toothed rack having a gear connection with the apron. The apron is provided with guides 1 and 2 for the passage of the screw-shaft 3, a two part nut 4, embraces the screw shaft and is operated by the hand lever 5, for the purpose of forming a connection between the screw shaft and apron for screw cutting, and may be disengaged therefrom, such however has formed the subject matter of my previous patents. The rack 6, is located on the under side of one of the guides of the lathe bed, and a toothed wheel 7, located in the apron, meshes with the teeth of the rack, said toothed wheel can be operated by a handle 8, for the purpose of moving the apron and parts connected therewith by hand when such movement is desired.

A shaft 9, extends crosswise of the lathe bed for the purpose of operating the cross feed of the lathe or when it is desirous to move the tool crosswise of the lathe bed for facing or cutting off. This shaft can be operated by hand by means of the handle 10.

Thus far I have described the ordinary construction of a lathe apron, and my improvements consist in forming a connection between the line feed or cross feed with the driving screw or shaft, said connection being by friction so that when the tool encounters hard cutting the friction will slip thereby saving damage to the other parts of the driving mechanism.

The apron is provided with a hub 11, which is centrally bored, and through this opening extends a tubular shaft 12, having its outer end screw-threaded, this shaft projects from a base 13, which has a hub 14, projecting from its opposite face, the tubular shaft forms the center upon which this base oscillates. One end of the base is provided with a slot 15, and a semi-circular opening 16, is located near its lower edge. The wedge shaped projections 17, extend from the rear face of the base for a purpose to appear hereinafter. The end of the base opposite the slot 15, has a stud 18, extending therefrom and upon which a combined toothed wheel 19, and pinion 20 are mounted, and move with the base during its oscillations. Within the central opening of the shaft 12, is located the shank 21, of the friction disk 22, which extends some distance beyond the end of said shaft. This shank is enlarged at its junction with the friction disk, which enlargement is formed into a toothed pinion 23. An internally screw threaded cap 24, is turned onto the end of the tubular shaft 12, and a jam nut 25 holds it in position when adjusted. A friction wheel 26, is mounted on the screw shaft 3, and is capable of a movement in the lengthwise direction of the shaft by means of the handle 27 engaging an arm 28, connected with the wheel, the wheel can be held in proper adjustment by tightening the handle. This friction wheel

rotates with the shaft by a feather engaging the lengthwise groove thereof. The pinion 23, on the rear face of the friction disk meshes with the teeth of the wheel 19. A train of gearing composed of toothed wheels 30, 31, 32, and 33 connected with the toothed pinion 7, which engages the toothed rack. The wheel 33, of this train is located near the center of the friction disk, for a purpose to appear hereinafter. The toothed wheel 34, meshes with a toothed wheel 35, located on the screw shaft 9, of the cross feed, and this toothed wheel 34, is located near the center of the friction disk.

In Fig. 6, I have shown the means for oscillating the base 13, which consists of a handle 36, having a stud 37 extending therefrom through the apron and entering the slot 15, of the base. This stud moves in a semi-circular slot 38, and by turning the handle the base can be moved to assume the positions shown in Figs. 3, 4 and 5.

A pointer 39, located on the outside of the apron has a stud 40 projecting from its inner end and moves within the semi-circular opening 16 of the base. This stud limits the movement of the base 13, and determines whether the line feed or cross feed are in or out of engagement according to the position of the pointer as shown at Fig. 1. If the pointer stands in the position of "out" at Fig. 1, it means that the pinion 20, is out of engagement and occupies the position at Fig. 3. When the pointer stands at "cross feed" the pinion is in engagement with the toothed wheel 34, and consequently will drive the screw of the cross feed as shown at Fig. 4, when the pointer stands at "line feed" the pinion will be in engagement with the toothed wheel 33, and the power thus transmitted will extend through the gears 33, 32, 31, 30 and 7 to the rack 6, which will move the apron bodily in the lengthwise direction of the lathe bed, and the stud of this pointer prevents the movement of the base so as to throw the other feed into engagement without first changing the position of the pointer. The handle 36, imparts the oscillatory movement to the base by the stud 37, traversing the slot 15, and will occupy the three positions shown at Figs. 3, 4 and 5.

In Fig. 6, I have shown the friction disk out of engagement with the friction wheel and a flat spring 41, for holding it in this position; this position is assumed when it is desirous to stop or change the movement of the apron or of the cross feed, in order that the apron or cross feed may be operated by hand, or the lathe used for screw cutting. When the friction is thrown into engagement it will be necessary to advance the friction disk, this is accomplished by the same movement of the handle 36, that throws the pinion 20, into engagement with the toothed wheels of either the line or cross feed, and the means used consists of the wedge shaped projections 17, extending from the face of the base 13, entering V shaped recesses 42 in the inner face of the apron, when the friction disk is out of contact with the friction wheel, but when the base is moved so as to throw the pinion into engagement with either the line or cross feed, the projections ascend the inclined face of the recesses 42, until they ride upon the inner face of the apron which will impart an advancing movement to the friction disk causing it to engage the friction wheel, and a reverse movement will bring the projection within the recess allowing the spring 41, to act upon the base, carrying the disk out of engagement with the wheel. It will be noticed that the first portion of the movement of the base is to form the frictional engagement, and after this is accomplished, the remaining movement will form the gear connection. When the frictional engagement is not completed the gear connection is also not completed.

It may be necessary to adjust the friction disk so as to increase or decrease the frictional contact between it and the friction wheel, this is accomplished by moving the shank of the friction disk endwise by the screw cap.

By the above construction of a lathe I am able to impart movement to the cutting tool either in the lengthwise direction or transversely of the lathe bed, and said movement is always under the positive control of the operator, and the cutting tool can be moved in the reverse directions by moving the friction wheel across the face of the friction disk beyond its center when the direction of rotation will be reversed, and the speed of the disk can be varied by moving the wheel across the face of the disk.

I claim as my invention—

1. In a lathe, the combination of a lathe apron, a cross feed, a friction disk carried by the apron, a friction wheel, a toothed rack, gear connection between the friction disk and toothed rack, gear connection between the cross feed and friction disk, the gear connection between the rack and friction disk and between the cross feed and friction disk made movable into and out of engagement, the friction wheel made movable across the face of the friction disk.

2. A lathe apron provided with gear and friction mechanism for operating the cross and line feeds, a pinion mounted on a movable base for forming a connection between the friction mechanism and gearing of the cross and line feeds, said base provided with projections which enter recesses in the apron when the pinion is out of mesh, and which ride upon the inner face of the apron when the pinion is in mesh, a spring pressing on the base holding it in contact with the apron and means for moving the base against the spring force.

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