E. W. MITCHEL.

GRINDING MACHINE.

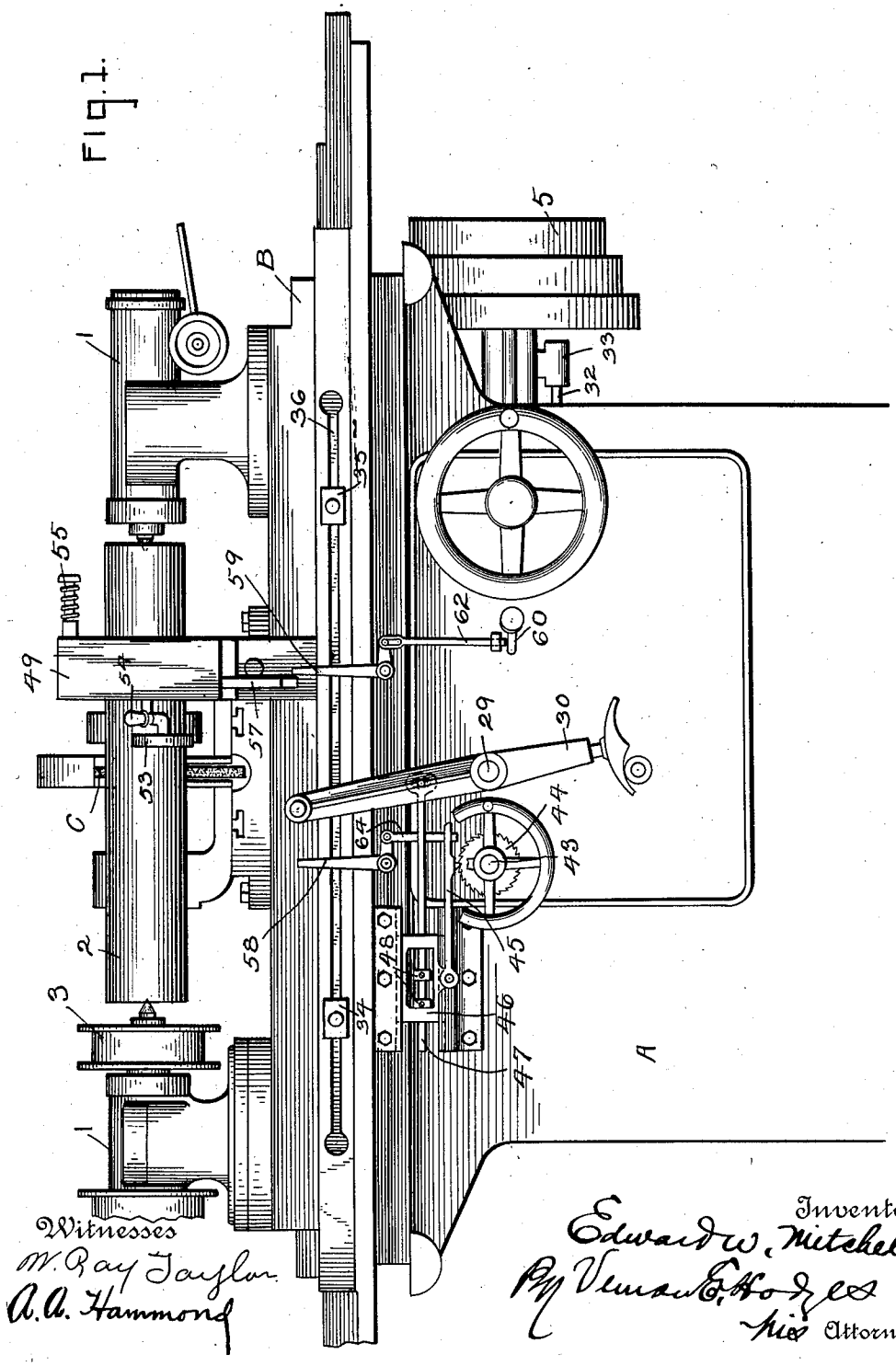
APPLICATION FILED JUNE 8, 1910.

991,345.

Patented May 2, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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Inventor

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4 SHEETS—SHEET 2.

Fig. 2.

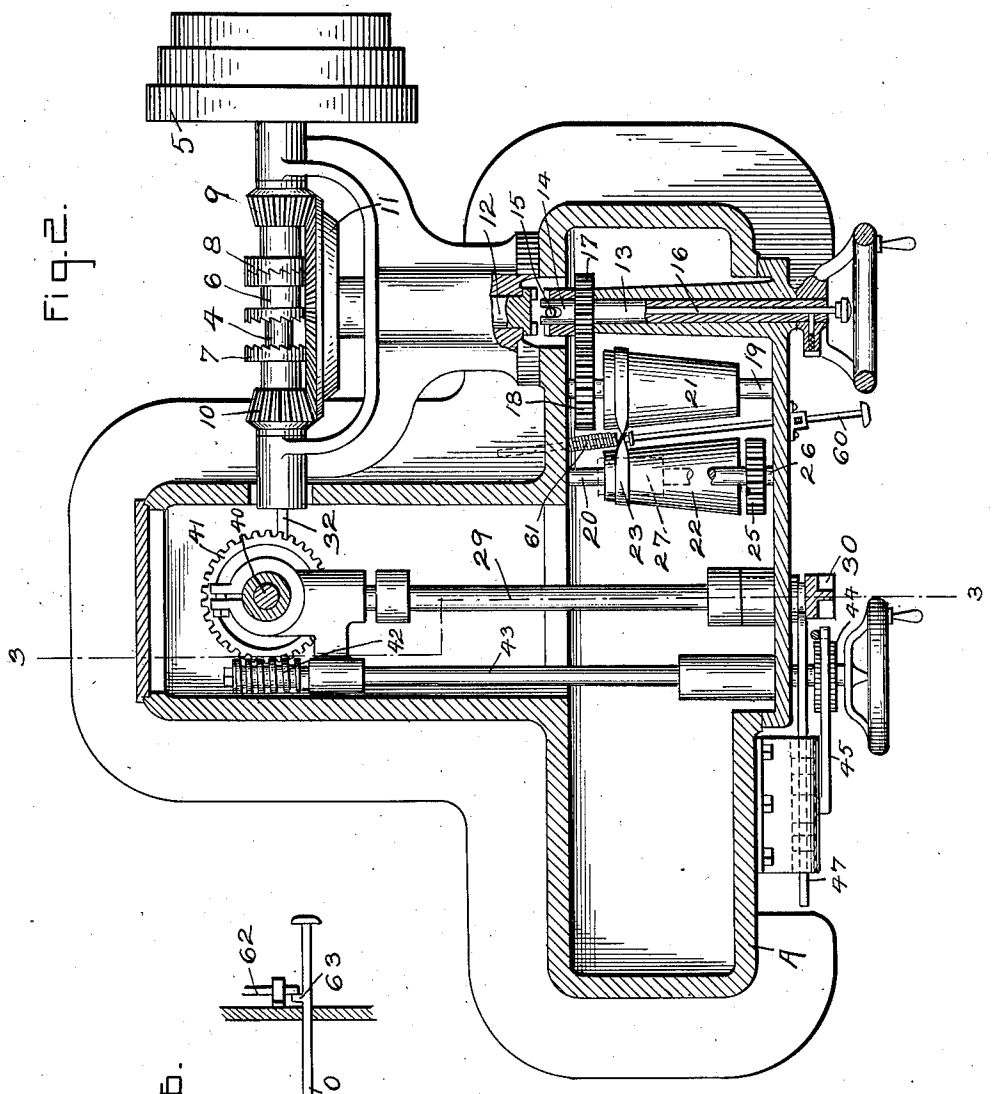
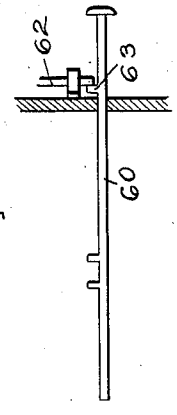


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 3.

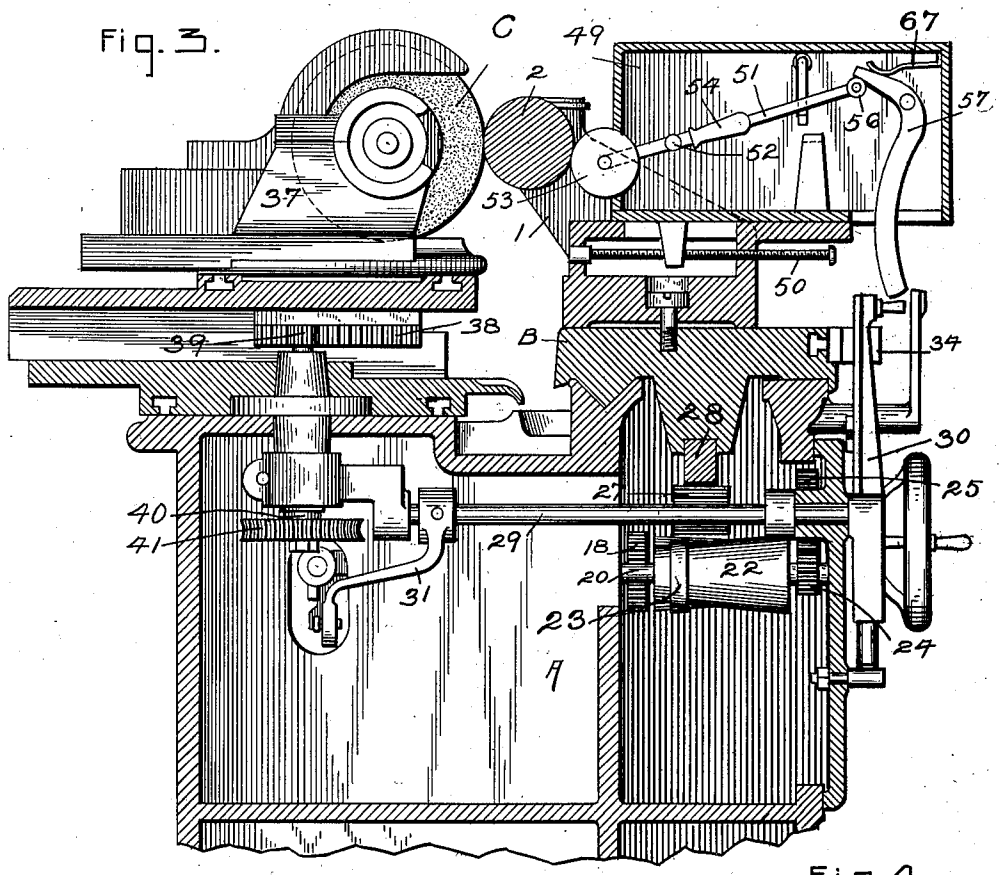
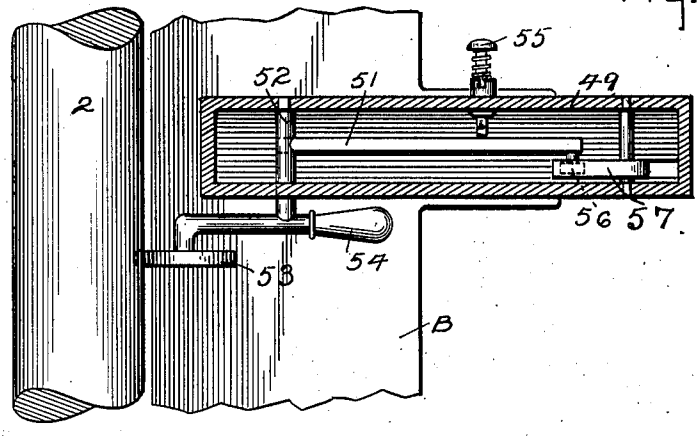


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

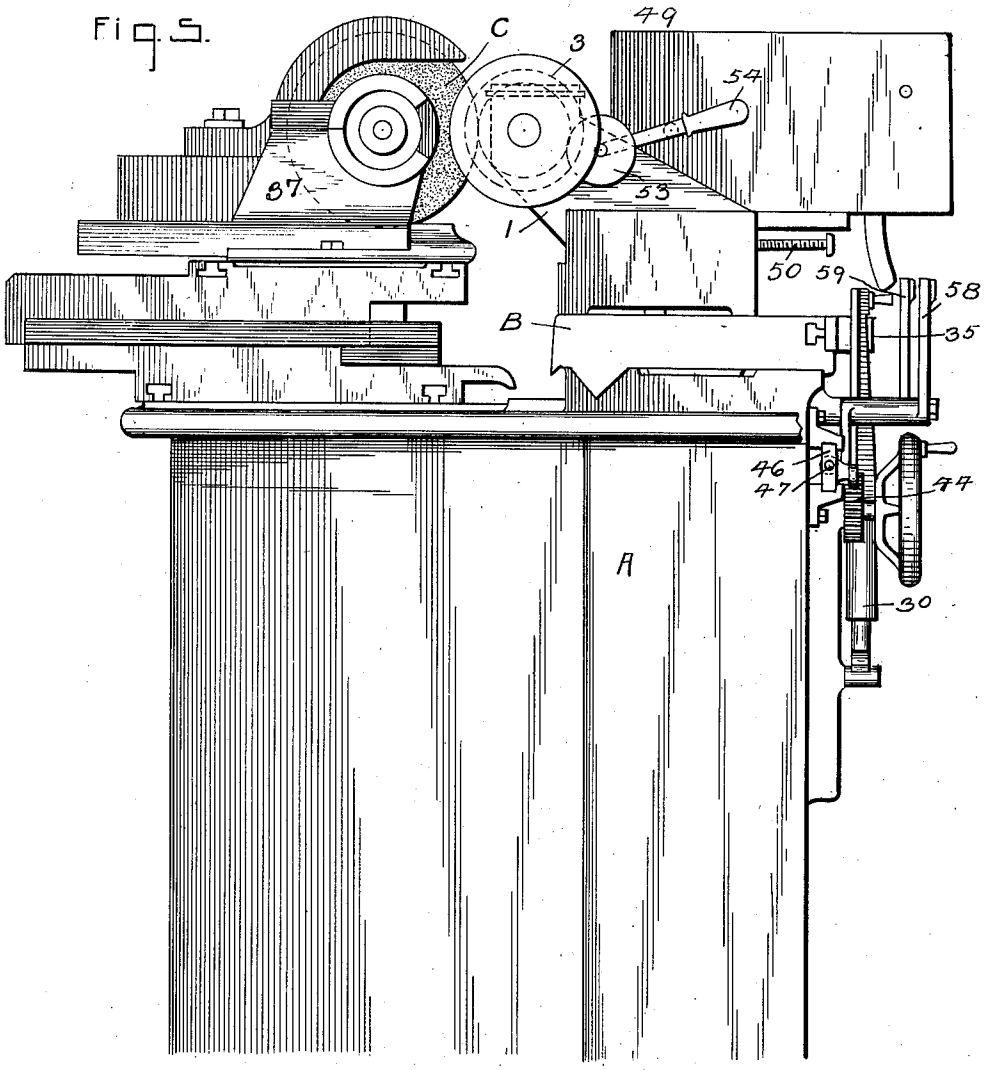
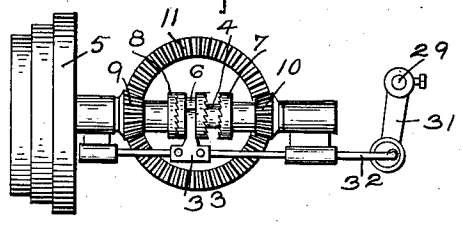


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWARD WILSON MITCHEL, OF LEXINGTON, KENTUCKY.

GRINDING-MACHINE.

991,345. Specification of Letters Patent. Patented May 2, 1911.

Application filed June 8, 1910. Serial No. 565,837.

To all whom it may concern:

Be it known that I, EDWARD W. MITCHEL, a citizen of the United States, residing at Lexington, in the county of Fayette and State of Kentucky, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

My invention relates to an improvement in grinding machines, and the object is to provide means whereby the speed of the carriage can be changed from a roughing cut to a finishing cut, and the cross feed of the grinding wheel stopped.

The invention consists in certain novel features of construction and combinations of parts which will be hereinafter fully described and pointed out in the claims.

In the accompanying drawings:—Figure 1 is a view in side elevation; Fig. 2 is a longitudinal cross-sectional view; Fig. 3 is a vertical sectional view; Fig. 4 is a top plan view of the tripping mechanism; Fig. 5 is an end view of the machine; Fig. 6 is a detail view of the belt shifting mechanism; and Fig. 7 is a detail view showing the clutch shaft with its clutches.

A represents the machine, and B is the carriage, which is provided with bearings 1, 1, which support the shaft to be worked upon, as indicated at 2. A pulley 3 is provided on one of the bearings for transmitting a rotary movement to the shaft. A driving shaft 4 is mounted upon the frame, and has a pulley 5 which is adapted to receive power from any suitable source for rotating the shaft 4. A double clutch member 6 is splined upon the shaft, adapted to make engagement with either of the clutch faces 7 and 8. Pinions 9 and 10 are mounted upon the shaft, and are adapted to mesh with a gear wheel 11, which is mounted upon a shaft 12. A shaft 13 is adapted to be thrown into engagement with the shaft 12 by the clutch member 14 which is keyed to the shaft 13 by means of the pin 15. The rod 16, which is connected to the clutch member 14, is adapted to reciprocate the clutch member 14 for connecting or disconnecting the shafts 12 and 13. A gear wheel 17 is mounted upon the shaft 13, which is adapted to be rotated upon the rotation of the shaft 12. A gear wheel 18 is mounted upon the shaft 19, which gear wheel meshes with the gear wheel 17. Shafts 19 and 20 are provided with cone-shaped pulleys 21 and 22, respectively, a belt 23 connecting the two pulleys together. The rotation of the shaft 12 transmitting motion to the gear wheel 17, causes the shaft 19 to be rotated through the gear wheel 18. The movement or rotation of the shaft 19 causes the shaft 20 to be rotated through the pulleys 21 and 22 and belt 23. A pinion 24 on the shaft 20, meshes with the gear wheel 25 on the shaft 26. The shaft 26 carries a gear wheel 27 which is adapted to mesh with the rack 28 on the carriage B. In this manner, the carriage is caused to be operated.

A shaft 29, journaled in the frame, has a lever 30 mounted thereon. A crank arm 31 is connected to the shaft 29, and eccentrically connected to the crank arm 31 is a rod 32 which carries a fork 33, which is received between the double clutch member 6 for reciprocating the members upon the shaft 4, whereby the clutch member 6 will be caused to engage either the clutch face 7 or 8, according to the direction of movement that the carriage is to take. Lugs 34 and 35 are adjustably supported in a slot 36 in the carriage. These lugs are adapted to be engaged by the lever 30 for oscillating the shaft 29. The oscillation of the shaft 29 causes the double clutch face 6 to be reciprocated upon the shaft 4. For instance, the clutch 6 would be disengaged from the clutch face 8, indicated in Fig. 2, and thrown into engagement with the clutch face 7 and cause it to move in the opposite direction to that in which it was traveling when the clutch face 8 was in engagement with the clutch member 6.

The grinding wheel C is mounted upon a carriage 37, which moves cross-wise of the machine. A rack 38 on the carriage 37 is engaged by a gear wheel 39 on a shaft 40, which shaft is journaled in the frame A. A

gear 41 on the shaft 40 meshes with a worm gear 42 on the shaft 43.

A ratchet wheel 44 is mounted on the shaft 43 and is engaged by a pawl 45 which is pivotally mounted upon a block 46. A rod 47 is pivotally connected to the lever 30 and is provided with stops 48, 48, which are adapted to engage the block 46 for reciprocating it for causing the pawl 45 to rotate the ratchet wheel 44. The rotation of the ratchet wheel 44 is caused by the reciprocation of the carriage, which reciprocation is governed by the oscillation of the lever 30. The operation of the lever 30 by the movement of the carriage, causes the rod 47 to be moved, and the movement of the rod 47 moves the block 46, causing the pawl to rotate the ratchet wheel 44. This movement of the ratchet wheel rotates the shaft 43, which transmits a step by step movement to the cross feed carriage 37 through the worm gear 42, gear wheel 41, shaft 40, gear wheel 39 and rack 38.

Mounted upon the carriage B is a casing 49, which is capable of being fed cross-wise by means of the screw 50. A lever 51 is mounted on the shaft 52 journaled in the casing 49. Journaled on the outer end of the lever, is a wheel 53 which is adapted to engage the working shaft 2. A handle 54 is provided on the lever for placing the wheel 53 or for raising the lever prior to the operation of the machine, so that the lever 51 will be engaged by the spring-controlled stem 55 for holding the wheel out of engagement during the setting of the shaft to be worked upon. A roller 56 is journaled on the outer end of the lever 51, which is adapted to be engaged by the pawl 57 which is pivotally mounted in the casing. The other or lower end of the pawl 57 projects through the bottom of the casing and is adapted to trip the levers 58 and 59.

A rod 60 is connected to the belt 23 for shifting the belt for changing the speed of the pulleys 21 and 22. A spring 61 is mounted upon the rod 60, so that the rod is under spring tension, and is held under the tension by the link 62 which engages a notch 63 on the rod and holds the rod under the spring tension. The link 62 is connected to the bell crank lever 59 which is operated by the pawl 57 when it is desired to change the speed of the carriage. A link 64 is connected to the pawl 45. Connected to the link 64 is the bell crank lever 58 which is adapted to be operated by the pawl 57, for stopping the cross feed of the grinding wheel C.

When the shaft 2 has been set and the machine is ready for operation, the wheel 53 is adjusted to the position desired, by the screw 50, so that it can be automatically determined when the shaft has been ground down to the proper shape. After the wheel has been set, the pawl 57 is brought into engagement with the roller 56 on the lever 51, and the stem 55 is withdrawn from engagement with the lever. A spring 67 holds the pawl 57 in engagement with the roller 56. When the shaft has been ground down sufficiently, or within a few thousandths of the required size, the speed of the carriage is automatically changed for changing the cut of the shaft from a roughing to a finishing cut. This is accomplished by the pawl 57 coming in contact with the lever 59. As the pawl 57 comes in contact with the lever 59, the lever is tripped, operating the link 62, whereby the rod 60 is released, causing the belt 23 to be shifted upon the pulleys 21 and 22, whereby the speed of the carriage is reduced. The grinding of the shaft 2 causes the wheel 53 to continue to rise, and as it rises, or moves above the shafts, the pawl 57 will be caused to move outward, where it will come into engagement with the bell crank lever 58. The tripping of this lever 58 will cause the pawl 45 to be raised out of engagement with the ratchet wheel 44, thereby stopping the cross feed of the grinding wheel C. The grinding wheel C and shaft 1 can continue to rotate until stopped, but the fact that the cross feed has been stopped, the driving wheel will not produce a cutting action upon the shaft.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a grinding machine, the combination with a movable carriage, means for driving the carriage, means for changing the speed of the carriage, means for feeding the grinding wheel toward the carriage, of levers connected to the speed mechanism of the carriage and cross-feed mechanism of the grinding wheel, and mechanical tripping mechanism adapted to engage the lever for changing the speed of the carriage, and then engaging the lever for stopping the cross-feed of the grinding wheel.

2. In a grinding machine, the combination with a movable carriage and grinding wheel, means for driving the carriage, means for changing the speed of the carriage, means for feeding the grinding wheel cross-wise of the machine, levers connected to the speed mechanism of the carriage and cross feed of the grinding wheel, of a lever engaging the work operated upon, and means operated by the lever adapted to first engage the lever for changing the speed of the carriage and then engaging the lever for stopping the cross feed of the grinding wheel.

3. In a grinding machine, the combination with a movable carriage and grinding wheel, means for driving the carriage, means for feeding the grinding wheel cross-wise of the machine, of a lever adapted to engage the

work, a pawl engaging the lever adapted to be operated by the movement of the lever, a lever connected to the carriage driving mechanism adapted to be engaged by the pawl for changing the cut upon the work from a rough to a finishing cut, and a lever connected to the cross feed mechanism adapted to be engaged by the pawl upon the completion of the finishing cut for stopping the cross feed of the grinding wheel.

In testimony whereof I affix my signature, in the presence of two witnesses.

EDWARD WILSON MITCHEL.

Witnesses:

J. H. TUDOR,

B. O. LANGSTON.