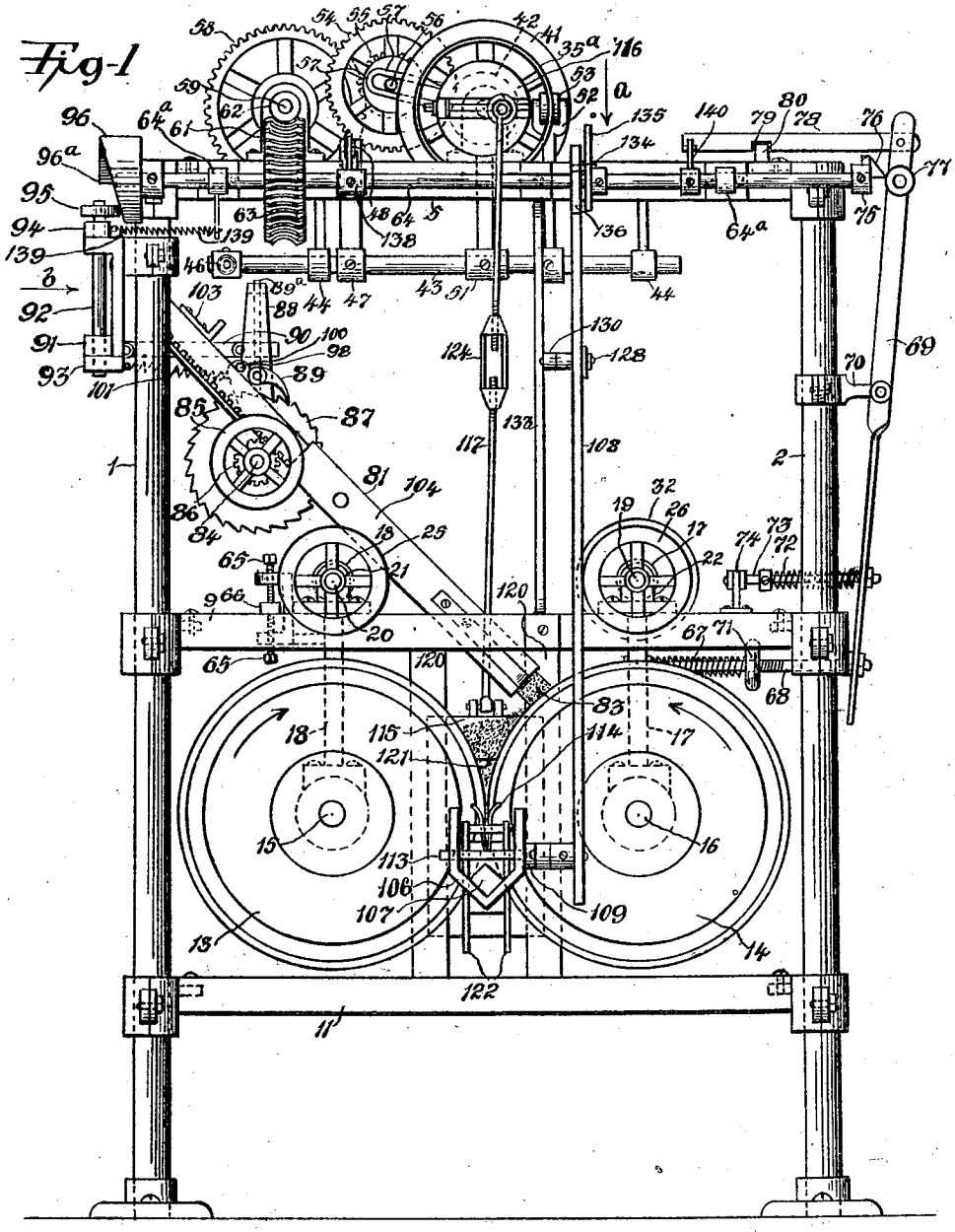
May 27, 1924. 1,495,738

F. O. HEMMING

CUTLERY POLISHING MACHINE

Filed May 16, 1922 5 Sheets-Sheet 1

Fig-1



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May 27, 1924. 1,495,738

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CUTLERY POLISHING MACHINE

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Fig-2

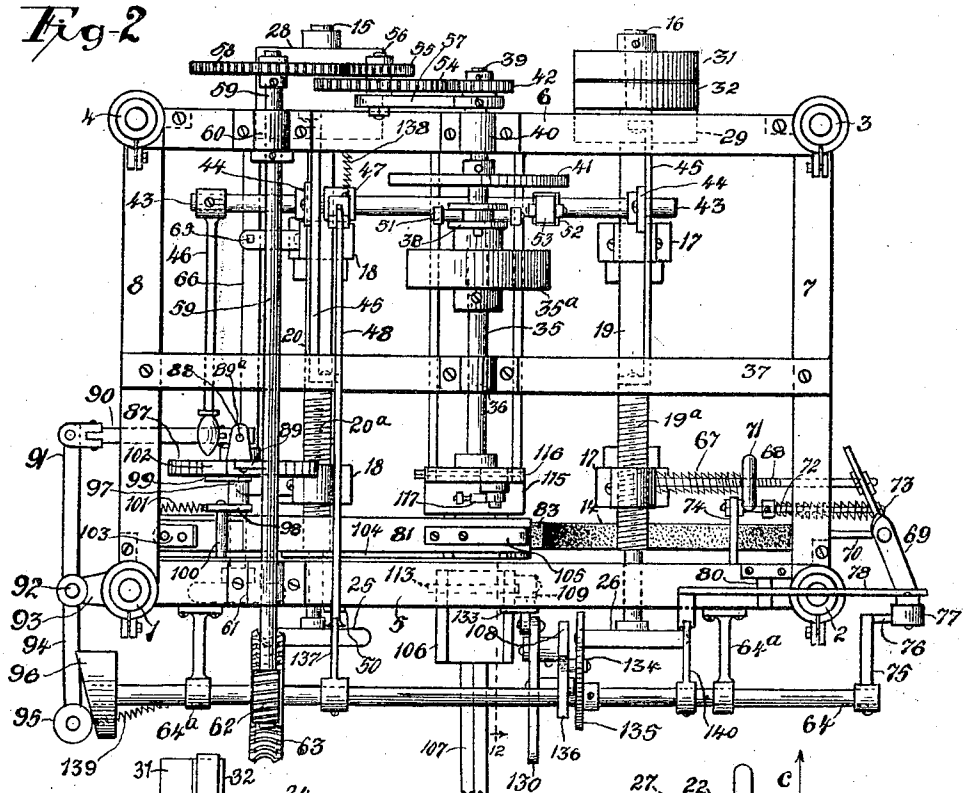
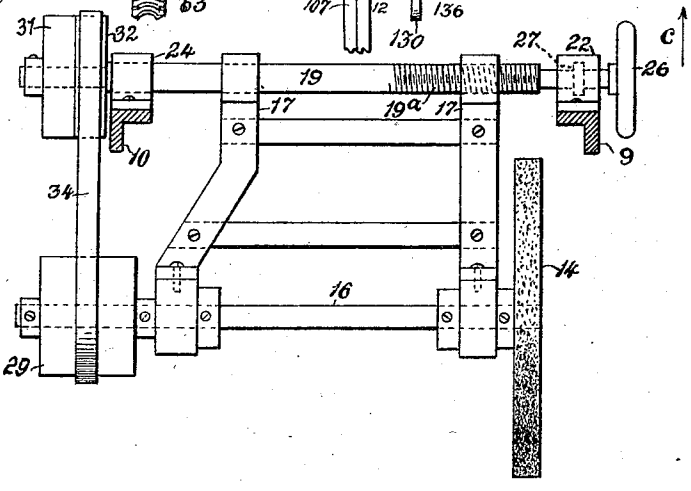


Fig-3



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May 27, 1924. 1,495,738

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CUTLERY POLISHING MACHINE

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Fig-4

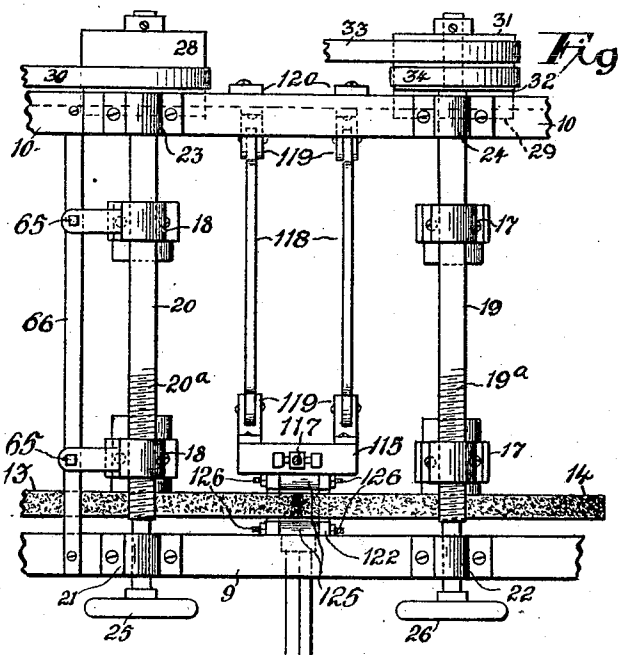


Fig-5

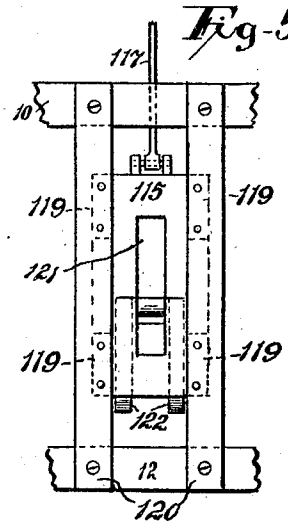


Fig-6

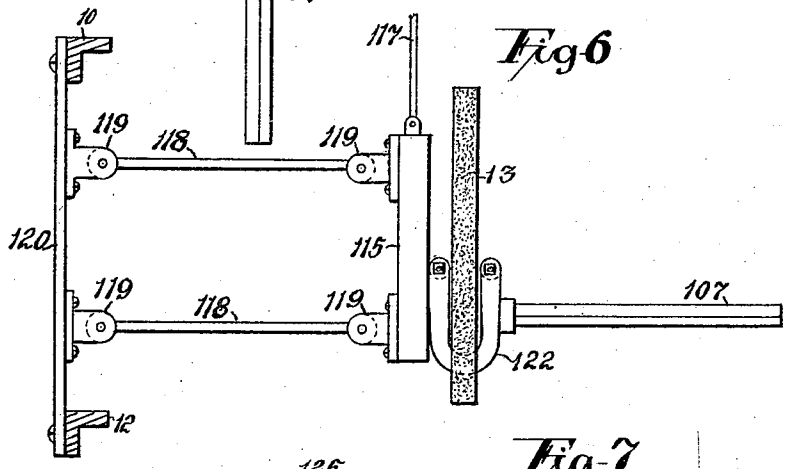
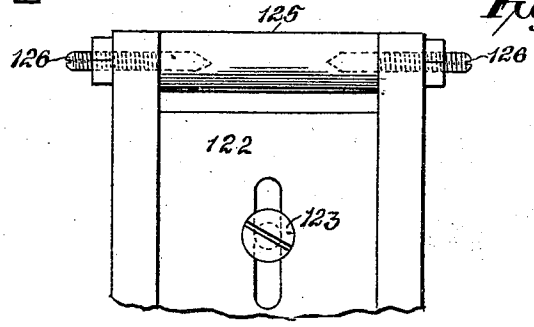


Fig-7



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CUTLERY POLISHING MACHINE

Filed May 16, 1922 5 Sheets-Sheet 4

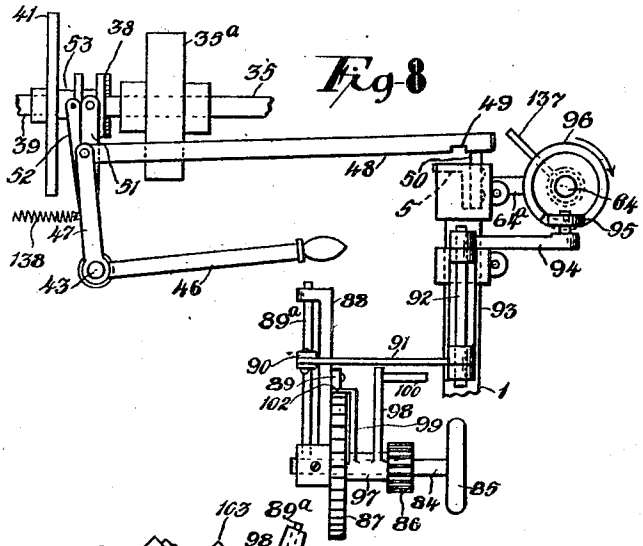


Fig 8

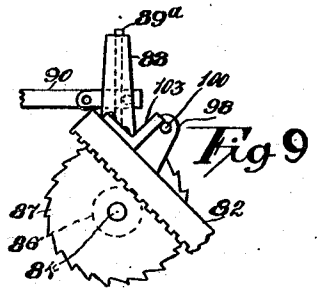


Fig 9

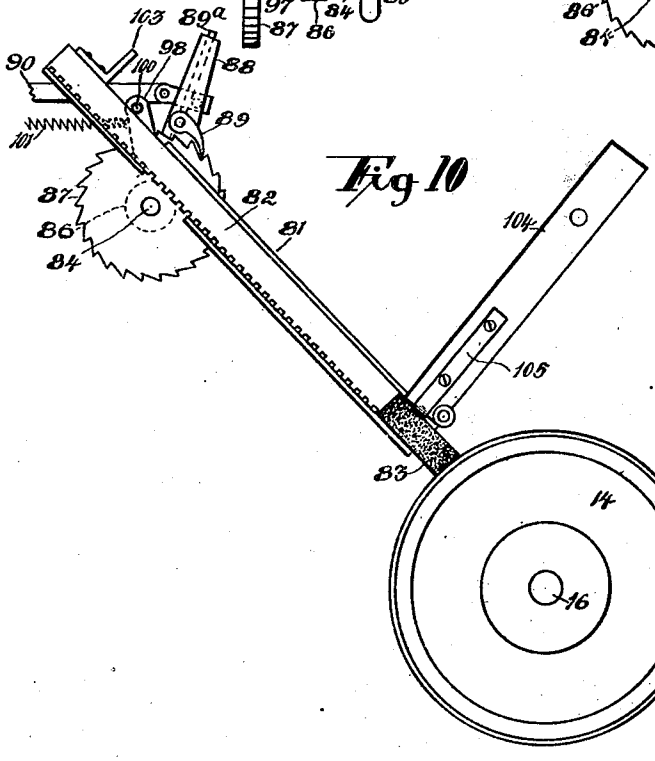


Fig 10

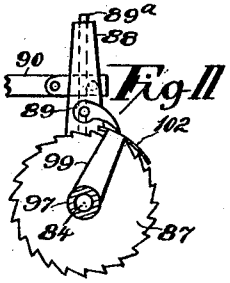


Fig 11

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CUTLERY POLISHING MACHINE

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Fig-12

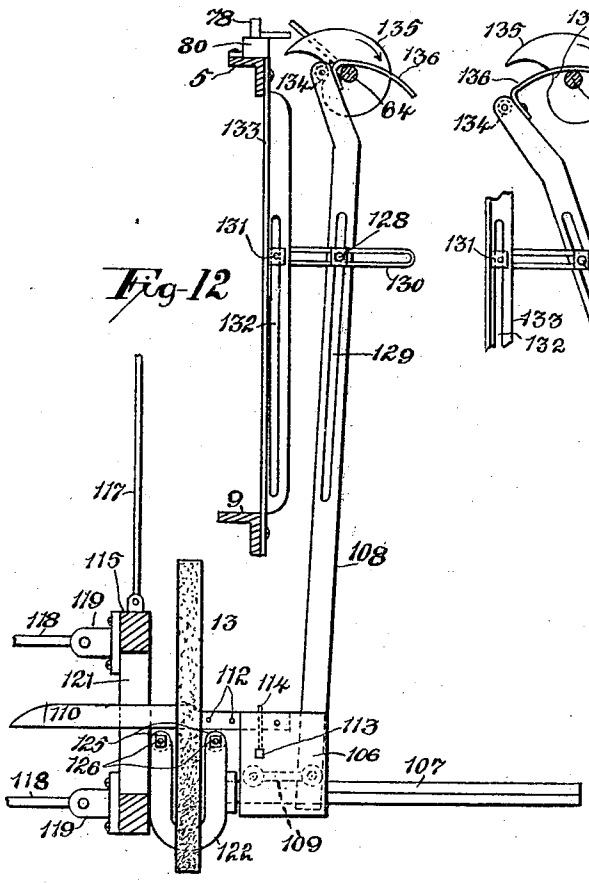


Fig-13

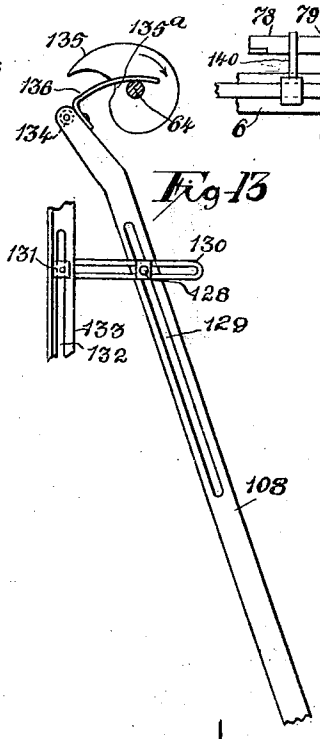


Fig-14

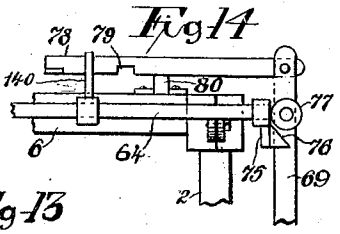


Fig-15

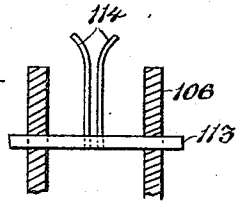
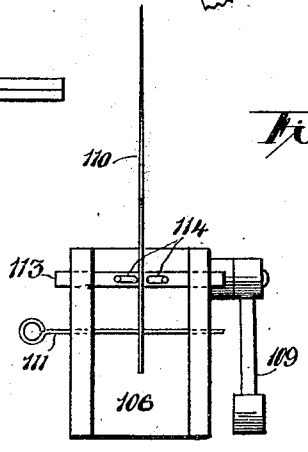


Fig-16



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Geo. D. Phillips ATTORNEY.

Patented May 27, 1924. 1,495,738

UNITED STATES PATENT OFFICE.

FREDERICK O. HEMMING, OF NORTH HAVEN, CONNECTICUT.

CUTLERY-POLISHING MACHINE.

Application filed May 16, 1922. Serial No. 561,314.

To all whom it may concern:

Be it known that I, FREDERICK O. HEMMING, a citizen of the United States, residing at North Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Cutlery-Polishing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to cutlery polishing machines and particularly to the type wherein two opposed polishing wheels are employed.

Referring to the accompanying drawings wherein the same numerals of reference indicate like parts throughout the several views;

Figure 1 represents a front elevation of the machine;

Figure 2 is a plan view of the machine looking in the direction of arrow *a* of Figure 1, also a broken view of the knife holder support;

Figure 3 is a side elevation of one of the polishing wheels, its supporting and actuating and controlling mechanism, and sectional view of part of machine frame;

Figure 4 is a plan view of the polishing wheels and their supporting mechanism, broken view of the machine frame, one of the polishing wheels and driving belts, also sectional view of the rod for oscillating the knife holder support;

Figure 5 is a rear elevation of the mechanism connected with the knife holder support, broken view of the machine frame and the rod for oscillating the knife holder support;

Figure 6 is a side elevation of one of the polishing wheels, knife holder support, sectional view of the machine frame, and broken view of the oscillating rod;

Figure 7 is an enlarged broken view of a part of the knife holder support showing one of the knife supporting rollers;

Figure 8 is a broken side elevation of the main driving shaft, side elevation of the clutch mechanism, and partial view of the abrasive feeding mechanism looking in the direction of arrow *b* of Figure 1;

Figure 9 is a side elevation of a part of the abrasive feeding mechanism comprising the ratchet wheel, broken view of its actuating lever and rack;

Figure 10 is a front elevation of one of the polishing wheels, side elevation of the rack and its case or housing showing the cover thrown back, ratchet wheel and mechanism connected therewith, and broken view of ratchet wheel operating lever;

Figure 11 is a side elevation of the ratchet wheel and mechanism in a non-feeding position;

Figure 12 is a sectional view of the cam shaft and frame on line 12 of Figure 2, side elevation of one of the polishing wheels, knife holder partly sectional and partly broken view of the knife holder and knife fully advanced toward the polishing wheels, showing also the position of its actuating lever;

Figure 13 represents the actuating lever in the position it will occupy at the full retreated position of the knife holder;

Figure 14 is a broken view of the upper part of the frame, and tripping mechanism looking in the direction of arrow *c* of Figure 2;

Figure 15 is an enlarged detail view partly in section of the knife holder, and

Figure 16 is an enlarged detail plan view of the knife holder and link connected thereto.

The machine frame is of skeleton construction comprising the four tubular uprights 1, 2, 3, and 4, connected by the angle iron braces 5, 6, 7, 8, 9, 10, 11, and 12. Angle irons are preferably employed for bracing the tubular columns as they afford the necessary support for the operating mechanism, and any number may be used to give the necessary strength to the frame.

The opposed polishing wheel 13, 14, are mounted on arbors 15, 16, journaled in the swinging frames 17, 18, Figures 1, 3, and 4. These frames are mounted on the shafts 19, 20, journaled in the boxes 21, 22, 23, 24, mounted on the angle irons 9 and 10. The threaded ends 19^a, 20^a, Figure 4, register with the threaded ends of the swinging frames 17, 18, nearest to the polishing wheels so that said frames can be longitudinally adjusted on their supporting shafts 19, 20, by

means of the hand wheels 25, 26. While said shafts can be rotated to adjust the position of the frames with respect to the alignment of the polishing wheels, their end movement is prevented by means of a collar, integral with the shafts located in the boxes 21, 22; one only of these collars 27 is shown, viz, that in the box 22, Figure 3.

On the outer rear ends of the polishing wheel arbors are mounted the pulleys 28, 29, Figures 2 and 4. The former is driven directly by the belt 30. On the rear outer end of the shaft 19, Figures 2, 3, and 4, are journaled the pulleys 31, 32, which pulleys are connected together and are driven by the belt 33, Figure 4, while the belt 34, see also Figure 3, connects with the pulleys 29 to rotate the polishing wheel arbor 16.

The main driving shaft 35, carrying the driving pulley 35^a, Figure 2, has its inner end journaled in the standard 36 secured to the cross bar 37, while its outer end is connected with the clutch sleeve 38 of the clutch shaft 39 journaled in the standard 40 located on the angle iron or brace 6. The shaft 39 carries the plate 41 and the gear 42.

The underlying shipper rod 43, see also Figure 1, is journaled in the hangers 44 attached to short bars 45 secured to the angle iron 6 and the bar 37. To this rod is secured the handle lever 46, and lever 47, see also Figure 8, is pivoted to the rod 48 having the notch 49 adapted to engage with the projection 50 secured to the angle iron 5, for the purpose to be hereinafter more fully explained. The clutch lever 51 is also secured to shipper rod 43 as well as the lever 52 carrying the shoe 53 adapted to be brought into contact with the plate 41.

54, 55, Figures 1 and 2, are intermediate gears journaled on the pin 56 adjustably located in the slotted arm 57. The gear 54 meshes with the gear 42 of the clutch shaft, and the gear 55 with the gear 58 on the worm shaft 59, which shaft is journaled in the standards 60, 61, and carries the worm 62 meshing with the worm gear 63 on the cam shaft 64, which cam shaft is rotated through the medium of said worm shaft, and is journaled in the brackets 64^a.

The polishing wheel 13 is adjusted with respect to its relation to the wheel 14 by means of the adjusting screws 65, Figures 1 and 4, contacting with the stationary bar 66. The polishing wheel 14 is under the tension of the spring 67, see also Figure 2, mounted on the threaded rod 68 which rod is connected with the polishing wheel frame 17 and the lever 69 pivotally supported to the bracket 70. The interiorly threaded hand wheel 71 adjusts the tension of the spring 67 to give the required flexibility to the polishing wheel 14 and its supporting mechanism, while the stored up tension in the spring 72 will serve to force the polishing wheel 14 away from the polishing wheel 13 at the completion of the polishing operation.

The spring 72 is mounted on the rod 73, which rod is attached to the lever 69 and the bracket 74. The cam shaft 64, see also Figure 14, has the lever 75 with its cam face 76 adapted to engage the roll 77 on the lever 69 and force outward the upper end of lever 69 to store up tension in the spring 72. The lever 69 carries the lever 78 with the notch 79 adapted to interlock with the lug 80 to temporarily hold the compression of spring 72.

81, Figures 1, 2, 8 and 10, is a case or other like receptacle, in which is located the rack 82 bearing against the cake of emery 83, or other like abrasion material. This cake rests against the polishing wheel 14 and is gradually fed down by the rack as it is worn away as follows:

84 is a shaft carrying the hand wheel 85, pinion 86, ratchet wheel 87 and arm 88, which arm carries the pawl 89 to engage with the toothed wheel 87 to carry forward the rack 82. 89^a is a rod attached to the arm 88 to which is pivotally connected the lever 90, which lever is also pivotally connected to the lever 91 secured to the shaft 92 journaled in the bracket 93. 94 is a lever secured to the upper end of said shaft carrying the roller 95 adapted to engage with the spiral faced cam 96 on the cam shaft 64.

97, Figure 8, is a sleeve journaled on the shaft 84 carrying the arms 98, 99. The former has the pin 100 adapted to be normally held against the rack 82 by means of the spring 101, Figures 1, 2, and 10. The arm 99 carries the shield 102, Figure 11, overlying the teeth of the ratchet wheel 87. The spiral face of the cam 96 will gradually turn the ratchet wheel through the before mentioned elements, viz: roller 95, levers 90, 91, 94, and pawl 89, as fast as the emery cake is worn away by its contact with the wheel 14, keeping said wheel always coated with polishing material, and, at the same time, throwing off polishing material sufficient to coat the polishing wheel 13, as shown in Figure 1.

As soon as the emery cake has been used up, the lug 103, on the rack 82, will engage the pin 100, Figure 9, and turn the sleeve 97 to advance the arm 99 to place the shield 102, Figure 11, directly under the pawl 89 to keep said pawl out of contact with the teeth of the ratchet wheel 87 and thus prevent feeding the rack against the polishing wheel to the detriment of the latter. As soon as an emery cake has been exhausted, the cover 104, Figure 10, is raised to insert another cake, after the rack has been carried back by means of the hand wheel 85 and pinion 86. The position of the lug 103

with respect to the pin 100 corresponds to the length of the emery cake. The spring 105, Figure 10, on the cover 104, bears against the side of the emery cake to maintain it in operative position.

The knife holder 106, Figures 1 and 12 is mounted to have a sliding movement on the angular rod 107 through the medium of the lever 108 to which it is pivotally connected by the link 109. The knife blade 110, see also Figure 16, is temporarily held in the knife holder by means of the pin 111 passing through the holder and one of the rivet holes 112, Figure 12, in the shank of the knife. 113, see also Figure 15, is a bar having the guides 114 between which the blade is placed during the polishing operation. The bar 113 is adapted to have a lateral movement in the holder 106 so that the knife blade, when located between the polishing wheels, can readily follow any lateral movement of the wheels without cramping or springing the blade.

115, Figures 4, 5, and 6, is a block suspended from the eccentric 116, see also Figures 1 and 2, by the rod 117. The links 118 are pivotally connected to the brackets 119 of the block and bars 120. The opening 121, Figure 5, of the block is of sufficient area to give ample room for any lateral movement of the knife blade and the reciprocation of the block during the polishing operation. The U-shaped blade support 122 with the knife holder supporting bar 107 may be adjustably attached to the block 115 by the screw 123, Figure 7. This adjustment is necessary when the stroke of the eccentric 116 is changed to change the oscillation of the block for the varying widths of the knife blades. Or, the member 122 could be an integral part of the block 115 and such adjustment made by the turnbuckle 124, Figure 1. The rollers 125, Figures 4 and 6, support the back of a knife blade, and are journaled on the threadless portion of the screws 126, Figure 7, which screws project well into each end of the rollers and thus prevent the entrance of emery to wear the roller bearings.

The lever 108, Figure 12, to which the knife holder 106 is pivotally connected by the link 109, as before mentioned, is pivoted to the pin 128 located in the slot 129 of the lever and the slotted arm 130 adjustably connected to the pin 131 adjustably located in the slot 132 of the bar 133 secured to the angle irons 5, 9 of the machine frame.

The upper end of lever 108 carries the roll 134 adapted to be engaged by the cam 135 to gradually draw the knife holder and knife away from the polishing wheels during the polishing operation. The strip 136 is attached to the upper end of lever 108 and rests on the cam shaft 64 to serve as means to insure the proper location of the roll 134 with respect to the lowest part 135[a] of the cam 135.

While a finished blade is being removed from the holder and a new blade inserted, the cam shaft 64 is idle, and the locking levers 48, 78 and 75, Figures 8 and 14, are in the position shown, and the polishing wheel 14 is also away from the polishing wheel 13.

The lever 108 is first pushed toward the polishing wheels to bring the holder 106 and the blade 110 into the position shown in Figure 12. The handle lever 46 is then depressed to actuate the shipper rod 43 and engage the clutch sleeve 38, Figure 2, with the hub of the pulley 35[a] on the driving shaft 35, and thus transmit rotary movement from the driving shaft through the previously mentioned gears to the worm shaft and from thence to the cam shaft 64. In the meantime, the lever 48 will have been advanced to lock its notch 49 with the projection 50, Figure 2. The cam face 76 of the lever 75 will then engage the roll 77, Figure 1, and force out the upper end of lever 69; lock the lever 78, and thus force inward the lower end of lever 69, compress spring 72 and carry the polishing wheel 14 inward against the knife blade through the medium of the rod 68. The operation of the lever 69 does not take place at the same time that rotary movement is imparted to the cam shaft, but is delayed a trifle to give sufficient time for the inward movement of the knife holder into the position shown in Figure 12.

Placing the lever 108 in the position shown in Figure 12 will also carry the roller 134 against the face of the cam 135 as shown, and the rotation of the cam with the shaft will carry the knife holder gradually away from the polishing wheel until the knife blade is entirely removed therefrom, which will place the lever 108 in the position shown in Figure 13, with its roller 134 in its relation with respect to the cam 135 as shown. While the knife is being withdrawn from between the polishing wheels, the knife holder will be vertically reciprocated by means of the eccentric 116 through the medium of the rod 117 and the block 115.

As soon as the knife blade has been fully withdrawn from the polishing wheels at the completion of a revolution of the cam shaft 64, said shaft will be instantly halted by means of the trip lever 137, Figure 8, tripping and releasing the lever 48 and thus place the shipper rod 43 under the control of the spring 138, Figures 2 and 8, to release the clutch 38 and bring the shoe 53 against the plate 41 and thus abruptly halt all of the rotatable mechanism except the driving shaft pulley 35[a] and the polishing wheels.

At the completion of a revolution of the cam shaft, the roller 95, Figure 1, will have passed the high point 96[a] of the spiral face cam 96 and be brought to the lowest point

of said cam by the spring 139, and actuate levers 90, 91 and 94 to draw back the arm 88 and its pawl 89. The trip lever 140, Figure 14, will act at the same time, as the before mentioned trip lever 137, to trip the lever 78 and release the lever 69, which lever will then be actuated by the spring 72, Figure 1, to withdraw the polishing wheel 14.

The machine is readily adapted to polish knife blades of any length, by simply changing the gears to increase or decrease the rotation of the cam shaft 64, and changing the fulcrum of the lever 108 to carry the travel of the knife holder to suit the length of the blade. The vertical reciprocation of the knife holder will remain at the same speed for all lengths of blades, but the reciprocation will be shortened or lengthened to suit the width of the blade by changing the throw of the eccentric 116 on the driving shaft.

The machine above described is specially constructed to give to knife blades that high polish and lustrous finish heretofore produced by hand labor. In giving this peculiar finish to a blade, the hand operator does not hold the blade firmly against the polishing wheel, as this would leave a distinct polishing tract and thus defeat the very object sought which is to break up, destroy and obliterate all marks that would otherwise appear on a blade when kept in contact with the wheel. To produce this lustrous effect, the hand operator imparts a tremor to his arms which breaks up, what would otherwise be a steady pressure, into slight taps and leaves the surface of the blade entirely free from all polishing lines.

The present machine is particularly constructed to produce the effect above described. In the first place, the polishing wheels are supported above their center so that they hang by gravity, and are thus more sensitive to the vibratory motion required than if supported from below the center. The skeleton construction comprising the tubular corner uprights with the main portion of the mechanical elements located above the polishing wheels, will produce a vibratory motion or tremor throughout the entire machine structure which is transmitted to the polishing wheels, resulting in short and rapid vibratory movements to and from the knife blade.

This rapid vibratory motion of the polishing wheels together with the rapid, vertical oscillation of the knife holder and its slower withdrawal from between the wheels, will effectually break up all polishing lines and give a lustrous finish to a blade equal, if not superior, to that produced by hand labor.

Having thus described my invention, what I claim is:—

1. A polishing machine of the character described, comprising a machine frame, opposed polishing wheels journaled in swinging frames supported above the center of the wheels, a knife holder, a support therefor, a driving shaft, means for oscillating the holder and its support from said shaft, a cam shaft, mechanism for rotating the cam shaft, and mechanism connected with the cam shaft to gradually withdraw the knife holder from the polishing wheels during the polishing operation.

2. A polishing machine of the character described, comprising a skeleton machine frame, opposed polishing wheels suspended therefrom, a knife holder, a support therefor, a driving shaft, means connected therewith for oscillating the knife holder and its support, a cam shaft, intermediate mechanism between the driving shaft and cam shaft for rotating said cam shaft, clutch mechanism connecting the driving shaft with the cam shaft, means for locking the clutch mechanism, tripping mechanism on the cam shaft adapted to release the clutch mechanism at the completion of a revolution of the cam shaft, and means on said cam shaft for withdrawing the knife holder from the polishing wheels during the polishing operation.

3. In a polishing machine of the character described, comprising a frame, a cam shaft, means for rotating the same, opposed polishing wheels rotatably suspended from the frame, a knife holder, a support therefor, means on the holder to permit of lateral movement of a knife during the polishing operation, means for oscillating the holder and its support, a cam on the cam shaft, and a lever connecting the cam with the knife holder to gradually withdraw said holder from the polishing wheels.

4. In a polishing machine, in combination with pivotally suspended and opposed polishing wheels, a knife holder, a support therefor, roller supports connected with the knife holder support and located on each side of the polishing wheels, said rollers mounted on pivots located within their ends, driving shaft mechanism, clutch mechanism connected therewith, cam shaft mechanism located above the polishing wheels, means connected with the driving shaft mechanism for oscillating the knife holder and its support, a shipper rod connected with the clutch mechanism, means for temporarily locking said shipper rod, a polishing wheel controlling lever for locating one of the polishing wheels in operative position in contact with a knife blade, means for temporarily locking said lever under spring tension, means on the cam shaft for drawing the knife holder away from the polishing wheels during the polishing operation, and trip levers on said shaft for releasing the clutch mechanism and polishing wheel

controlling lever at the completion of a rotation of the cam shaft.

5. In a polishing machine of the character described, comprising a frame, polishing wheels suspended therefrom, a knife holder, a support therefor, means for oscillating said holder and support, a cam shaft, means for rotating the same, a polishing wheel controlling lever for locating one of the polishing wheels in operative position in contact with a knife blade, means for temporarily locking said lever under spring tension, means on the cam shaft for gradually drawing the knife holder away from the polishing wheels during the polishing operation, and tripping means on the cam shaft for releasing the polishing wheel controlling lever at the completion of the polishing operation.

6. In a polishing machine of the character described comprising opposed polishing wheels, mechanism for suspending and operating said wheels, driving shaft mechanism, cluch mechanism, shipper rod mechanism, a cam shaft rotated from the driving shaft mechanism, and means controlled by the shipper rod mechanism to halt the cam shaft at each rotation of said shaft.

In testimony whereof I affix my signature.

FREDERICK O. HEMMING.

Witnesses:

CHARLES C. ELWELL, Jr.,

OTTO L. HEMMING.