A. B. FOWLER.

GRINDING MACHINE.

APPLICATION FILED MAR. 1, 1917.

1,320,462.

Patented Nov. 4, 1919.

2 SHEETS—SHEET 1.

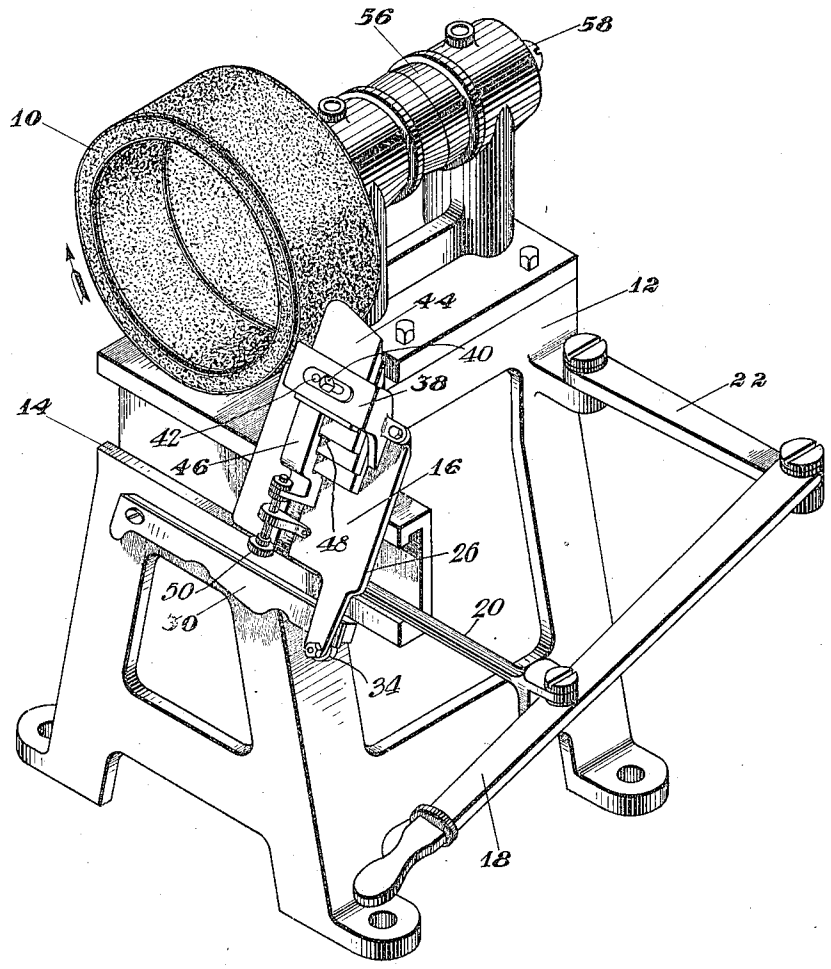


Fig. 1

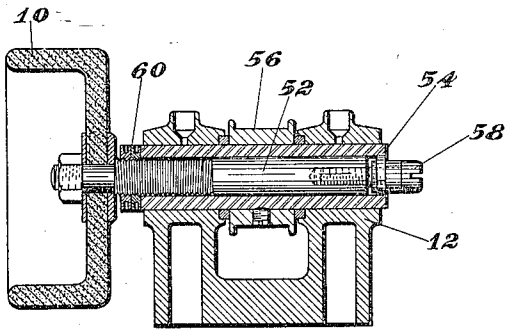


Fig. 2.

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By his Attorney
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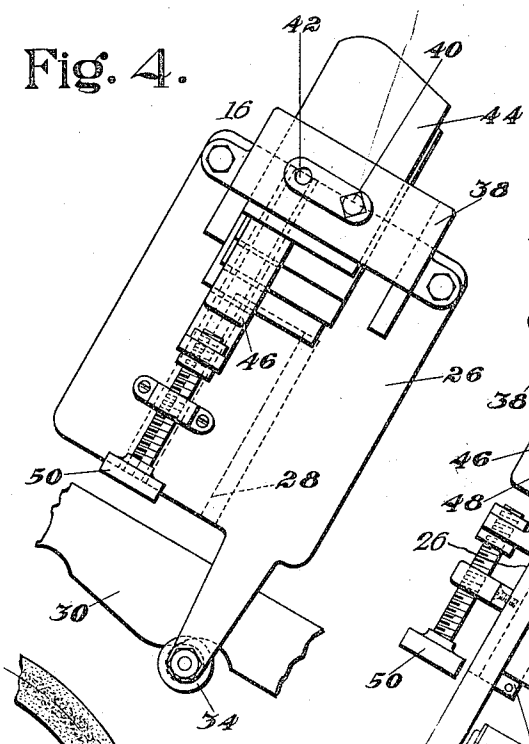
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2 SHEETS—SHEET 2.

Fig. 4.



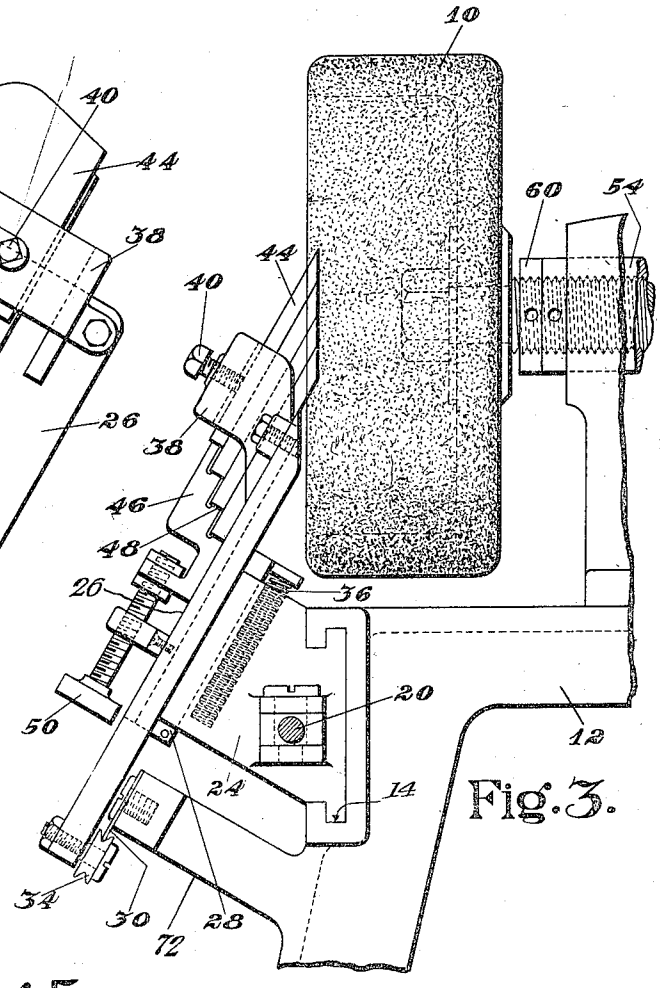


Fig. 3.

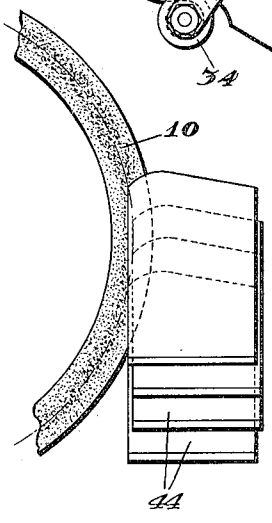


Fig. 5.

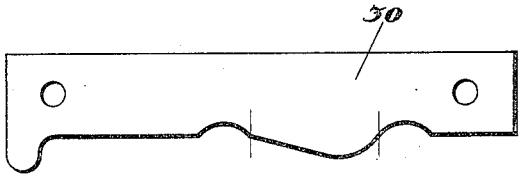


Fig. 6.

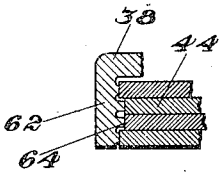


Fig. 7.

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UNITED STATES PATENT OFFICE.

ALFRED B. FOWLER, OF BEVERLY, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GRINDING-MACHINE.

1,320,462. Specification of Letters Patent. Patented Nov. 4, 1919.

Application filed March 1, 1917. Serial No. 151,847.

To all whom it may concern:

Be it known that I, ALFRED B. FOWLER, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Grinding-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawing indicating like parts in the several figures.

This invention relates to grinding machines and is particularly designed for grinding a plurality of knives with irregular edges so that the shape of the cutting edge of various knives will be identical.

It is common in many types of machines, notably in machines for trimming the heels of boots and shoes, to provide a rotating head in which there are inserted a plurality of similar knives. The cutting edges of these knives will be shaped in accordance with the work to be performed and it is essential to the proper operation of the machine that the knives shall be of equal length and that the shape of their cutting edges shall be identical. Such knives have commonly been ground one at a time and extreme care was necessary to insure resulting edges of the same shape. Even with such care, it frequently happened that the length of the various knives was different, with the result that the rotating head was unbalanced and that one knife did practically all of the work.

The object of this invention is to devise a simple and easily operated machine for presenting simultaneously a plurality of knives to a single grinding member in such a fashion that exact similarity of shape and length is insured.

To this end, I have provided a device for holding a plurality of blades in superposed relation and means for presenting these knives simultaneously to a grinding member so as to attain the desired result. One feature of the invention comprises an adjustable abutment adapted to be associated with the butt ends of the knife blades and arranged so that when the knives are clamped in the holder their beveled cutting edges form a continuous surface and preferably so that the cutting edges are in a line parallel to the plane of the active portion of the grinding member.

Another feature of the invention comprises means coöperating with the blades to present similar portions thereof to the action of the grinding member simultaneously whereby the blades are offset from one another to compensate for the curvature of the grinding wheel and it is insured that the blades will be ground with exactly similar cutting edges.

Other features of the invention will appear from a consideration of the following specification taken in connection with the accompanying drawings in which,—

Figure 1 is a perspective view of my grinding machine;

Fig. 2 is a longitudinal vertical section through the grinding member and its shaft;

Fig. 3 is a side view of the grinding member and the blade holding device;

Fig. 4 is a top view of the blade holding device;

Fig. 5 is a diagram showing the relation of the cutting edges of the various blades to the active portion of the grinding wheel;

Fig. 6 is a top view of one form of templet for guiding the blade holding device; and

Fig. 7 is a fragmentary transverse section showing the lateral abutment on the blade holding device.

A cup-shaped grinding wheel 10 is preferably employed which is mounted upon a shaft journaled in a frame 12 which comprises a track 14 arranged to permit relative transverse movement of the grinding member and a blade holding device 16. In the arrangement shown, the blade holding device is moved relatively to the grinding member by means of an operating handle 18 connected by means of links 20 and 22 to the blade holding device and the frame 12 respectively.

The blade holding device comprises a carriage 24 slidably mounted in the track 14. A supporting plate 26 is dove-tailed at 28 to the carriage 24 for movement toward and away from the grinding wheel. This move-

ment is controlled by means of a templet 30 supported upon a bracket 32 projecting outwardly from the frame 12. A roller 34 upon the plate 26 bears against this templet and a spring 36 is interposed between the carriage and the plate 26 to hold the roller 34 against the templet. A U-shaped strap 38 is attached to the upper surface of the plate 26 and is provided with a set screw 40 which may be inserted in either the position shown or the threaded hole 42 in order to clamp a plurality of blades 44 in superposed relation on the surface of the supporting plate 26.

For convenience in adjusting the position of the blades in the blade holding device, I have provided an abutment 46 having a plurality of stepped surfaces 48 which are adapted to contact with the butt ends of the various blades in order to project the upper blades beyond the lower ones in such a manner that their similarly beveled cutting edges form a continuous surface. These stepped surfaces of the abutment 46 are of slightly less thickness than the thickness of the blades with which it is intended that the machine shall be used and they are separated by slight recesses to avoid interference in case of a slight variation in the thickness of the blades. It will be noted from an inspection of Fig. 3 that the supporting plate 26 of the blade holding device 16 is arranged at an angle to the plane of the active portion of the grinding member corresponding to the angle at which it is desired to bevel the cutting edges of the blades 44. As a result, the cutting edges of the superposed blades will be in a line which will be parallel to the plane of the active portion of the cutting member so that the knives may be simultaneously presented to a single grinding member and to insure that a similar amount is ground from all of the knives. The abutment 46 is preferably slidably mounted on the plate 26 by means of a dove-tailed connection and a hand screw 50 is provided for obtaining accurate adjustment thereof. This enables the device to be adapted for knives of varying lengths and allows the operator to insert the knives in the holder and then to accurately adjust the same so that they will contact with the grinding member.

This adjustment is not intended, however, to allow for the wearing away of the grinding wheel for reasons which will be later apparent and an adjustment to compensate for this wear is provided by the arrangement shown in Fig. 2. From this figure it will be seen that the shaft 52 of the grinding member is slidably mounted within a sleeve 54 for rotation therewith. This sleeve is journaled in the frame 12. A pulley 56 is provided for the rotation of the sleeve and grinder shaft and adjustment of the shaft 52 longitudinally of the bearings is effected by a screw 58 threaded in the end of the shaft and in the sleeve 54. Lock nuts 60 are then provided for retaining the adjusted shaft in position.

It will be noted that although the active portion of the cup-shaped grinding member, viewed from the side, as in Fig. 3, appears to lie in a straight line, it is nevertheless evident that the various knives are being presented to portions of the periphery of the wheel which (see Fig. 5) lie upon the circumference of a circle. In order, therefore, that similar portions of each blade shall be simultaneously subjected to the action of the grinding member in order to produce like-shaped cutting edges, it is necessary to offset the superposed blades laterally with relation to one another so as to compensate for the curvature of the grinding member. To this end I have provided a lateral abutment 62 which is conveniently formed upon one arm of the U-shaped clamping member 38. This abutment 62 (see Fig. 7) is provided with stepped surfaces 64 arranged to contact with the lateral edges of the superposed blades 44 in order to properly offset the blades one from the other so that like points of their cutting edges will be simultaneously subjected (see Fig. 5) to the action of the grinding member. In this particular arrangement, I have preferred to arrange the device so that the cutting edges of two of the blades will be above the horizontal center of the grinding wheel and the cutting edges of the other two will be similarly spaced below such center. The stepped surfaces 64 are dimensioned and separated in a similar manner to the surfaces 48 and for a similar purpose.

In the operation of the device, the user will select a templet 30 corresponding to the shape of the blade which he desires to grind and apply the same to the bracket 32. He will then insert the blades in the holder so that their butt ends contact with the abutment 46 and their lateral edges with the abutment 62. After having properly adjusted the abutment 46 with the screw 50 to correspond with the length of the blade to be ground, he will clamp the blades by means of the set screw 40. This adjustment should bring the blades to such a point that the upper two and the lower two are equally spaced from a horizontal plane through the center of the wheel. If necessary, the latter should then be adjusted by means of the screw 58 so as to cause engagement of the blades and wheel. Then supposing that the grinding wheel is in rotation, it is only necessary to operate the handle 18 in order to cause the blades to be simultaneously and accurately ground with the assurance that like cutting edges will be produced and equal

lengths retained. It is obviously unnecessary to limit the arrangement to use with four blades and I contemplate its employment for a greater or less number of blades as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a grinding machine, a grinding member and a knife holder mounted for relative transverse movement, and means for supporting a plurality of flat knife blades having beveled cutting edges on said knife holder in superposed relation with their beveled cutting edges arranged to form a continuous surface for presentation to the grinding member.

2. In a grinding machine, a grinding member, and means for holding a plurality of blades in superposed relation, said grinding member and blade holding means being mounted for relative movement, said blade holding means comprising an abutment adapted to be associated with the butt ends of the blades and arranged to bring their cutting edges into line.

3. In a grinding machine, a rotating grinding member having its cutting surface disposed in a plane, and means for holding a plurality of blades in superposed relation for movement relative to said grinding wheel comprising adjustable means to bring the bevel ends of the blades into alinement with said plane.

4. A machine for grinding simultaneously a plurality of similar blades comprising a rotating grinding member, and means for holding a plurality of blades in superposed relation, said grinding member and said blade holder being relatively movable, said blade holder being arranged to locate said blades so as to compensate for the curvature of the grinding member whereby the blades will be ground with exactly similar cutting edges.

5. A machine for grinding simultaneously a plurality of similar blades with like cutting edges comprising a grinding wheel and a carriage mounted for relative transverse movement, blade holding means arranged to clamp a plurality of blades in superposed relation and mounted on said carriage for movement relatively thereto, a templet associated with the blade holding means to control the shape of the cutting edges to be ground, and resilient means urging said blade holding means against said templet.

6. In a grinding machine, a rotating grinding wheel and a blade holding means mounted for relative transverse movement, said blade holding means being adapted to hold a plurality of similar blades in superposed relation and provided with means cooperating with the blades to compensate for the curvature of the grinding member so that the cutting edges of the various blades will be ground exactly alike.

7. A machine for grinding a plurality of similar blades with like-shaped cutting edges comprising a rotatable grinding member and a blade holding device, said grinding member and said holding device being mounted for relative transverse movement, said holding device comprising means for clamping a plurality of blades in superposed relation, and an abutment adapted to be associated with the lateral edges of the blades to thereby offset the same with relation to one another in order to compensate for the curvature of the grinding wheel and cause the blades to be ground with like-shaped cutting edges.

8. In a grinding machine, a cup-shaped grinding wheel, a support provided with a track extending in a direction transverse to said wheel across the open side thereof, a carriage mounted for reciprocation on said track, blade holding means movably mounted on said carriage, a templet for guiding the movements of said blade holding means as the carriage is moved, said blade holding means comprising a clamp and an abutment contacting with the butt ends of the blades arranged to hold a plurality of blades in superposed relation with their beveled ends in line, said clamp being provided with an abutment contacting with the lateral edges of the blades to offset the same to compensate for the curvature of the cutting edge of the grinding wheel.

9. In a grinding machine, a grinding member and a blade holding device mounted for relative transverse movement, said blade holding device comprising a supporting surface, a U-shaped strap attached to said supporting surface and provided with a clamping device adapted to hold a plurality of blades in superposed relation against said surface, one side of said U-shaped member being provided with an abutment adapted to be associated with the lateral edges of the blades to offset the same to correspond with the curvature of the grinding member.

10. In a grinding machine, a curved grinding member, means for holding a plurality of blades for simultaneous presentation to different portions of said grinding member, said grinding member and said holding means being mounted for relative transverse movement, said holding means being arranged to present similar parts of the various blades to the action of the grinding member simultaneously whereby the blades will be ground with like-shaped cutting edges.

11. A machine for grinding a plurality of blades having irregular cutting edges com-

prising a rotating grinding member, blade holding means, said grinding member and said blade holding means being mounted for relative transverse movement, means for controlling said relative movement to determine the shape of the cutting edges to be ground, and means for clamping a plurality of blades in said blade holding means arranged to compensate for the curvature of the grinding member to the end that similar portions of each blade are simultaneously subjected to the action of the grinding member.

In testimony whereof I have signed my name to this specification.

ALFRED B. FOWLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."