Dec. 7, 1954 B. LEACH 2,696,067

GRINDING MACHINE

Filed Dec. 3, 1952 2 Sheets-Sheet 1

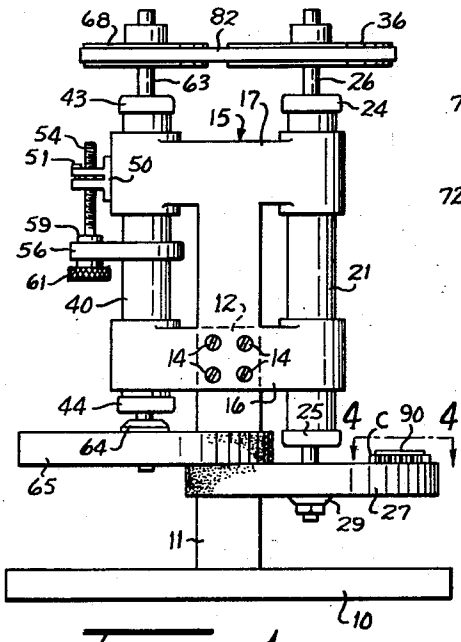


Fig = 1

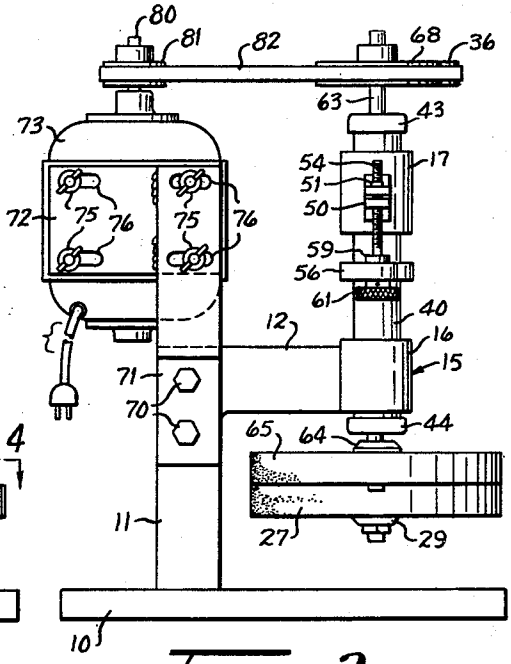


Fig = 2

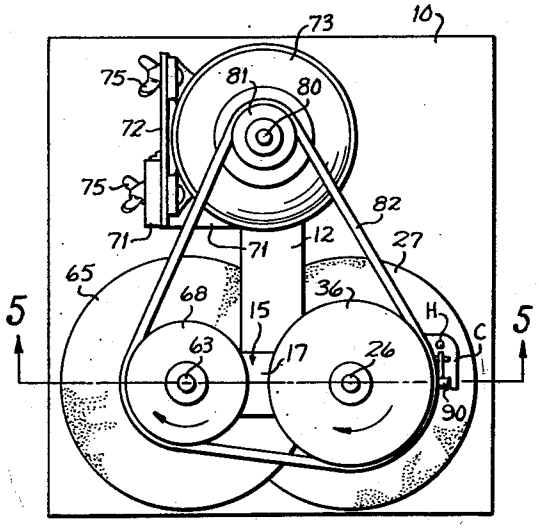


Fig = 3

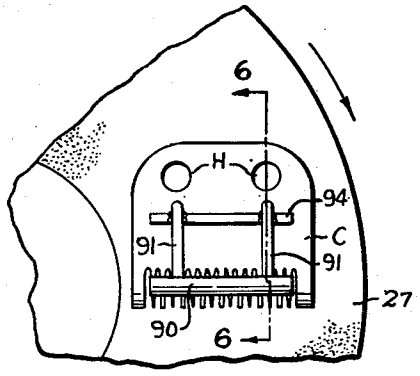


Fig = 4

BANNER LEACH.
INVENTOR.

BY Eaton & Bell

ATTORNEYS.

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GRINDING MACHINE

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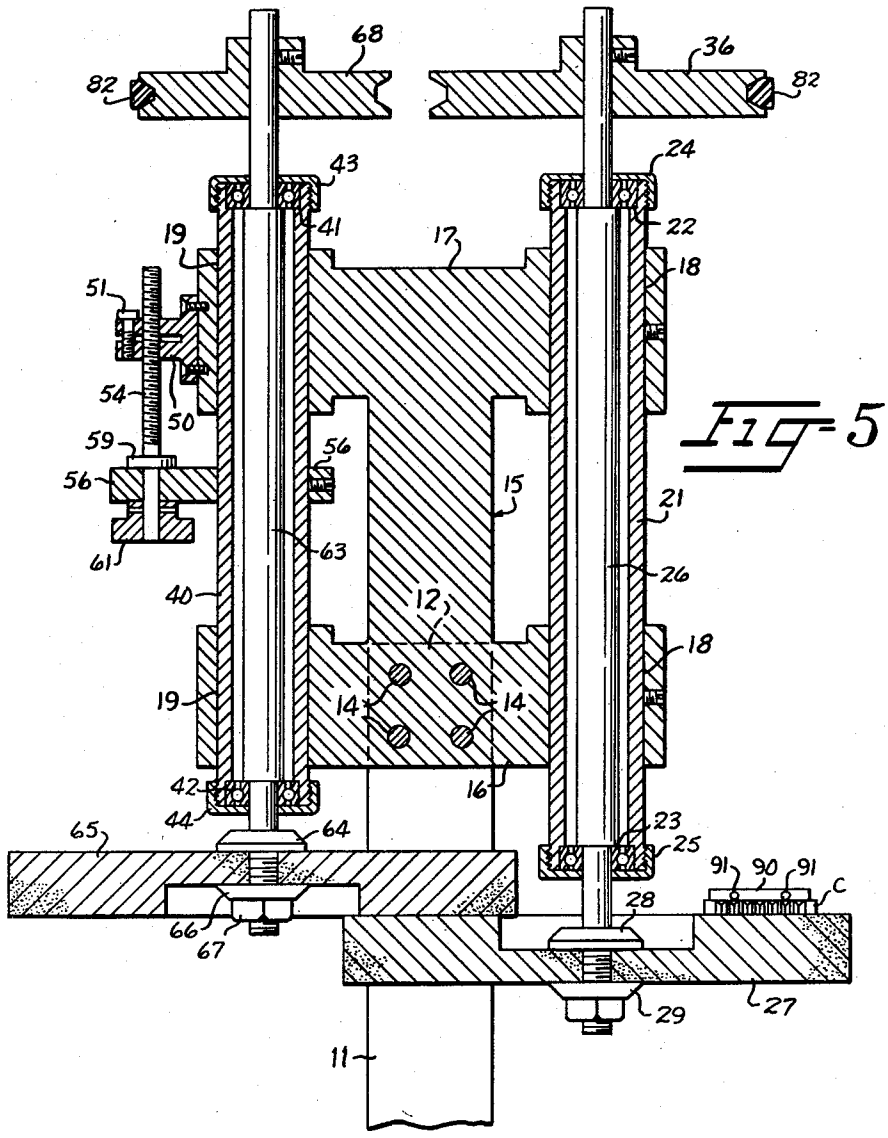


Fig. 5

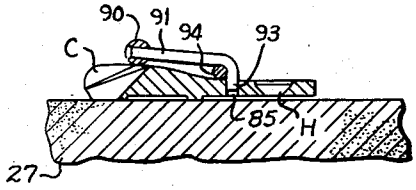


Fig. 6

BANNER LEACH,
INVENTOR.

BY Eaton & Bell

ATTORNEYS.

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GRINDING MACHINE

Banner Leach, High Point, N. C.

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3 Claims. (Cl. 51—109)

This invention relates to a grinding or abrading apparatus and more especially to a grinding machine having truing means associated therewith for maintaining an absolutely level grinding surface.

This machine is especially designed for the sharpening of clipper blades such as are used in association with clippers employed in the hosiery industry for clipping float threads from the interior surfaces of stockings. The yarn in float threads of the interior surface of stockings naturally has a certain amount of grit therein which quickly dulls the clipper blades, resulting in imperfect clipping and thus requiring the frequent renewal of blades. It is therefore an object of this invention to provide means for sharpening blades of this type so they can be used over and over again many times.

Clipper blades of this type are formed with the side walls of each of the teeth thereof sloping upwardly and inwardly toward each other, forming a bottom surface of substantial thickness. The side walls of the teeth of the blades slope upwardly at an angle of slightly more than 90 degrees so that the teeth are substantially triangular in cross-section which provides a more effective form of blade than if the side walls of the teeth were at 90 degrees to the base surface of the blade. Thus, it will be observed that a cutting edge is formed at the juncture of the bottom surface of each tooth and the lower edges of the side walls. For this cutting edge to be effective it is absolutely essential that the bottom surface of the teeth be absolutely flat and level. Heretofore, it has been extremely difficult to maintain such a flat and level surface and in many cases it has been impossible. This is largely due to the fact that in existing grinding machines no means is provided for truing the grinding surface and in use the grinding surface becomes worn and irregular and cannot be used for grinding blades of the type described.

Lapping of these blades has been tried, but in a lapping machine the lapping compound piles up around the cutting edges of the blades and this produces a very smooth cutting edge which is undesirable in clipper blades of this type. It is desirable that the blades have a rough or serrated cutting edge in order to properly engage and cut the float threads of the interior surface of stockings.

It is the primary object of this invention to provide a grinding machine having a grinding or abrading wheel upon which objects such as clipper blades of the type described may be positioned for grinding the same and wherein there is provided a driven dressing wheel having its lower surface in engagement with the upper surface of the abrading wheel and being adapted to engage the upper surface of the abrading wheel as the abrading wheel and the dressing wheel are rotated.

It is another object of this invention to provide a machine of the type described wherein the dressing wheel overlaps the abrading wheel for a distance substantially equal to the radius thereof and at least equal to the effective grinding radius of the abrading wheel, and wherein means are provided for holding the dressing wheel in fixed parallel engaging relation to the grinding wheel whereby the dressing wheel cannot be tilted relative to the grinding wheel so that the dressing wheel will serve at all times to maintain an absolute level surface on the grinding or abrading wheel.

It is another object of this invention to provide a grinding machine of the type described wherein a dressing wheel is provided for maintaining a level surface

on the grinding or abrading wheel and wherein means are provided for adjusting the position of the dressing wheel relative to the abrading wheel for holding the dressing wheel in engagement with the grinding surface of the abrading wheel and maintaining this engagement as the surfaces of the two wheels are worn away.

In this device, it is desirable that the abrading wheel be horizontally disposed about a vertical axis and that the dressing wheel be horizontally disposed parallel to the vertical axis of the abrading wheel and in grinding clipper blades of the type described, the blades should be placed upon the upper surface of the horizontally disposed abrading wheel with the teeth of the blade pointing in the direction of rotation of the abrading wheel. This places the bottom surface of each of the teeth as well as the body of the blade in engagement with the upper surface of the abrading wheel and causes said bottom surfaces to be ground absolutely flat and level and causes minute serrations in the cutting edges of the teeth.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings in which—

Figure 1 is a front elevation of the apparatus, omitting the electric motor;

Figure 2 is a side elevation of the apparatus looking at the left-hand side of Figure 1;

Figure 3 is a top plan view of Figure 1;

Figure 4 is an enlarged fragmentary plan view showing a clipper blade and holder therefor in position on the grinding wheel;

Figure 5 is a vertical sectional view taken substantially along the line 5—5 in Figure 3;

Figure 6 is a vertical sectional view taken substantially along the line 6—6 in Figure 4 through the blade and the holder therefor.

Referring more specifically to the drawings, the ordinal 10 indicates a base member having an upright member 11 which is preferably cast integrally therewith and rectangular in cross-section. A laterally projecting supporting arm 12, preferably integral with the member 11, extends from the upper end of the member 11 and has secured to the outer ends thereof by any suitable means, such as bolts 14, an H-shaped member broadly indicated at 15 which has a lower horizontal portion 16 and an upper horizontal portion 17, each of which is provided with vertically disposed bores 18 therein and bores 19 in the other ends of the horizontal members or supports 16 and 17.

Fixedly mounted in the bores 18 is a tube 21 having anti-friction bearings 22 and 23 in the upper and lower ends thereof, respectively, which are confined in position as by means of screw caps 24 and 25, respectively. Mounted in the anti-friction bearings 22 and 23 is a shaft 26 having a grinding or abrading wheel, or stone 27 fixed on the lower surface thereof as by means of a fixed collar 28 and a nut-confined collar 29. The shaft 26 has shoulders adjacent each of the bearings 22 and 23 to confine the shaft between the bearings and the upper end of the shaft 26 has a pulley 36 secured thereon.

The bores 19 have slidably mounted therein a tube 40 having anti-friction bearings 41 and 42 in the upper and lower ends thereof, respectively, which are confined therein as by caps 43 and 44, respectively. It will be noted that the ends of the tubes 21 and 40 are each counterbored to form a shoulder against which the anti-friction bearings are positioned and against which they are confined by the respective caps 24, 25, 43 and 44.

Secured to the outer surface of that end of the horizontal portion 17 having the bore 19 therein is a split bracket 50 having a screw 51 in both portions thereof bridging said split. An adjusting screw 54 is threadably mounted in the split bracket 50 and slidably penetrates a bracket 56 secured on the tube 40. A collar 59 is confined on the screw 54 on the upper side of the bracket 56 while a knob 61 is formed or confined on the lower end of the adjusting screw. This mechanism permits the tube to be adjusted vertically. The screw 51 can be driven home to serve as a means for taking up lost motion be-

tween the adjusting screw **54** and the threads in the split bracket **50**.

Rotatably mounted in the bearings **41** and **42** is a shaft **63** which is shouldered adjacent the proximal surfaces of the bearings **41** and **42** and this shaft has a collar **64** on its lower end against which a dressing stone or wheel **65** is confined by means of a washer **66** and a nut **67**. The upper end of the shaft **63** has a pulley **68** fixed thereon.

Secured to the standard **11** by any suitable means, such as bolts or screws **70**, is an upstanding support **71** which has welded near the upper end thereof a base plate **72** to which the base of an electric motor **73** may be secured by any suitable means such as thumb screws **75**. This plate **72** is provided with slots **76** for adjustment of the motor **73** in a horizontal position. The motor has an upwardly projecting motor shaft **80** on which a pulley **81** is fixed and a belt **82** is mounted on pulley **81** and is also mounted on the pulleys **36** and **68** on the upper ends of shafts **26** and **63**, respectively.

An ordinary cutter blade C is indicated in Figure 4, this being the main cutting blade and being adapted to mate with another cutting blade which is oscillatable relative thereto. The blade C has holes H therein, Figures 3, 4 and 6, and also a pair of finer holes, one of which is illustrated at **85**, Figure 6. Since this blade is very slick, due to its operating in sliding contact with a fixed tooth blade it is difficult to hold the same by pressure of the fingers thereon and there has been devised a suitable tool for holding the blade against the upper surface of the grinding stone **27** in which a member **90** is provided having prongs **91** extending therefrom provided with down turned ends indicated at **93** which are spaced apart from each other by a rod **94** welded to the arms **91** and **92** so that the prongs **93** can be quickly inserted in the vertical holes **85** to hold the cutting blade C against the grinding stone **27**. The transverse bar **94** not only holds the down turned portions **93** in proper spaced relation, but also serves as a limit gauge to prevent the lower portions of the down turned portions **93** from engaging the abrading stone **27**.

The mating blade, not shown, likewise has suitable holes and a similar tool as just described is provided for holding such blades against the upper surface of the grinding stone **27**. Of course this type of blade could be held by the hand by pressure of the fingers thereon, but as above stated, the blade has a very slick surface and also a tendency to heat up and this tool prevents the operator from having to wear gloves in order to exert the proper pressure on the cutting blade C and insures that the blade will be held in level engagement with the grinding wheel.

It will be noted in Figure 3 that the pulley **68** is preferably of smaller diameter than the pulley **36** and therefore the dressing or facing stone **65** will be driven at a greater number of revolutions per minute than the abrading stone **27** and, by the minute adjustment provided by threaded screw **54**, the facing stone can be adjusted vertically with relation to the abrading stone **27** to cause it always to remain in proper contact with the grinding stone to properly dress the grinding stone while the grinding stone is being used in an abrading operation. It is to be understood that the relative speeds of the abrading stone **27** and facing stone **65** may be varied by substituting pulleys of varying diameters for the pulleys **36** and **68**, as desired.

It will thus be observed that the manner in which the dressing wheel **65** is mounted prevents any tilting movement of the dressing wheel and causes the dressing wheel to be constantly maintained in a horizontal plane parallel to the horizontal plane of the abrading wheel. In the absence of such means for maintaining the position of the dressing wheel, the dressing wheel would be tilted and would thus dress the surface of the grinding wheel in an uneven manner so that the grinding wheel could not be used for precision grinding of objects such as the clipper blades described.

While this invention is particularly adapted for use in resharpening clipper blades, it is to be understood that it may be used for grinding or resharpening knives or any object requiring a flat precision ground surface. The design of this machine enables the operator to reface the surface of the grinding wheel to a precision degree unobtainable by other customary means which results in precision grinding also unobtainable heretofore. The dressing wheel may rotate in constant engagement with the abrading wheel, or if desired, it can be used only from time to time as needed.

In the drawings and specification there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. Abrading apparatus comprising a base member, an uprising member on the base member, a horizontally extending arm on the uprising member, a bearing stand secured to the free end of the arm, said bearing stand having a vertically extending portion and upper and lower spaced parallel horizontal portions, first and second tubular members mounted in parallel relationship in the ends of the horizontal portions, a first shaft mounted for rotation in the first tubular member and extending from both ends of the first tubular member and having a horizontally disposed bonded abrasive grain abrading wheel mounted on its lower end, a second shaft mounted for rotation in the second tubular member in parallel relation to the first shaft and extending from both ends of the second tubular member, a horizontally disposed bonded abrasive grain dressing wheel mounted on the lower end of the second shaft and partially overlying the abrading wheel and having its lower surface normally in contact with the upper surface of the abrading wheel, means drivingly connected to the upper ends of said shafts for driving the same in unison, the upper horizontal portion having a vertically disposed screw mounted therein, the second tubular member having a laterally projecting portion secured thereto and in which the screw is rotatably mounted, means confining the screw against endwise movement in the laterally projecting portion whereby upon rotation of the screw the dressing wheel may be adjusted vertically relatively to the dressing wheel.

2. An abrading apparatus comprising a base member, a common bearing support carried by the base member and having parallel upper and lower horizontally extending arms, the free ends of said horizontally extending arms having bores therethrough, the bores in the upper arm being in vertical alinement with the bores in the lower arm, a first vertically extending bearing sleeve mounted in the alined bores at first ends of said arms, a second vertically extending bearing sleeve mounted in the alined bores at the other ends of said arms, a first driven shaft rotatably mounted in the first bearing sleeve, a horizontally disposed bonded abrasive grain abrading wheel mounted on the lower end of the first shaft, a second driven shaft rotatably mounted in the second bearing sleeve for rotation on an axis parallel to the axis of rotation of the first shaft, a horizontally disposed bonded abrasive grain dressing wheel mounted on the lower end of the second shaft and partially overlying the abrading wheel, the lower surface of the dressing wheel normally being in contact with the upper surface of the abrading wheel to dress said upper surface during rotation of said wheels.

3. In a structure according to claim 2, adjustable means for raising and lowering the dressing wheel relative to the abrading wheel.

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