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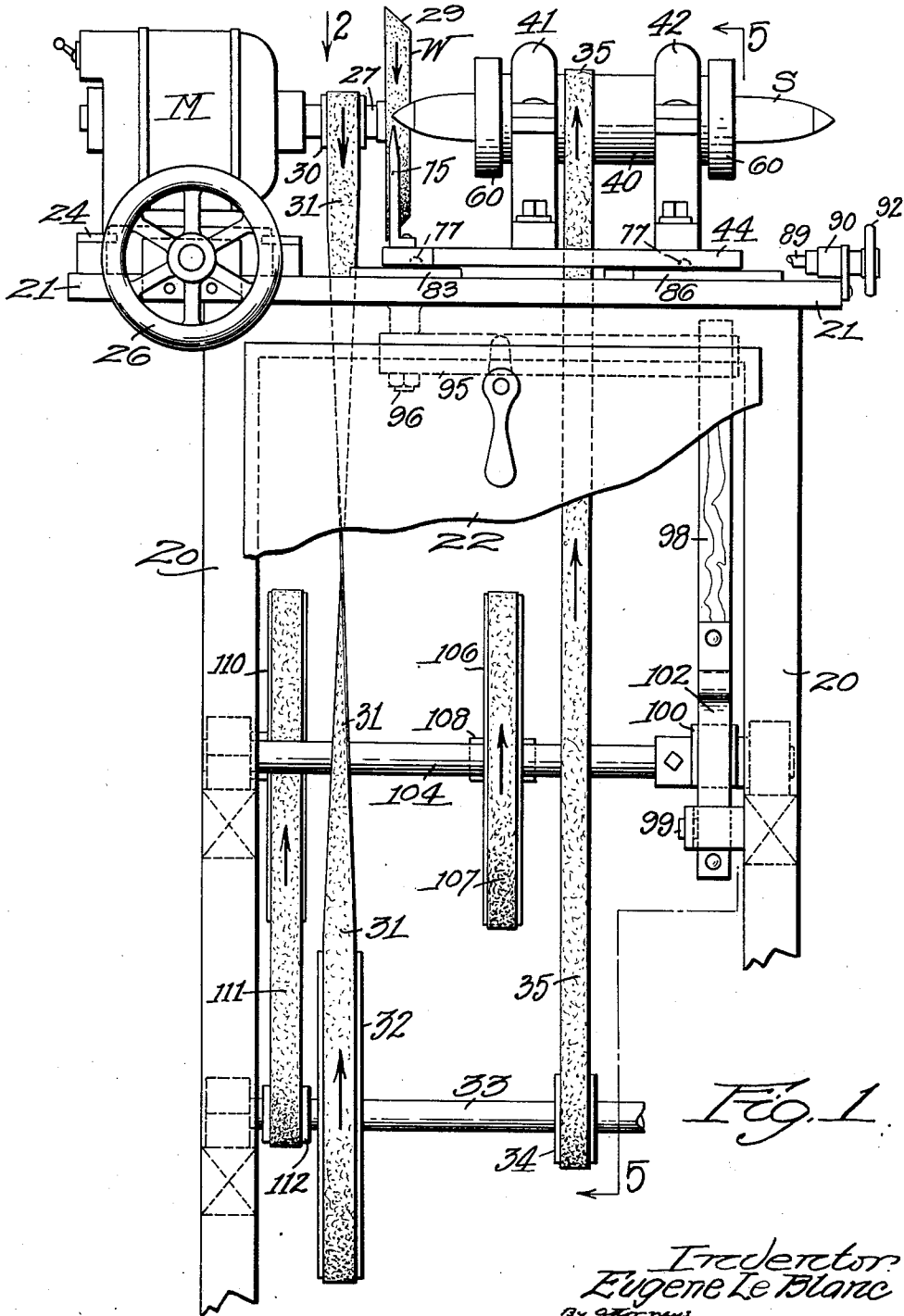
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1,993,064

MACHINE FOR GRINDING SHUTTLE POINTS

Filed April 2, 1934

4 Sheets-Sheet 1



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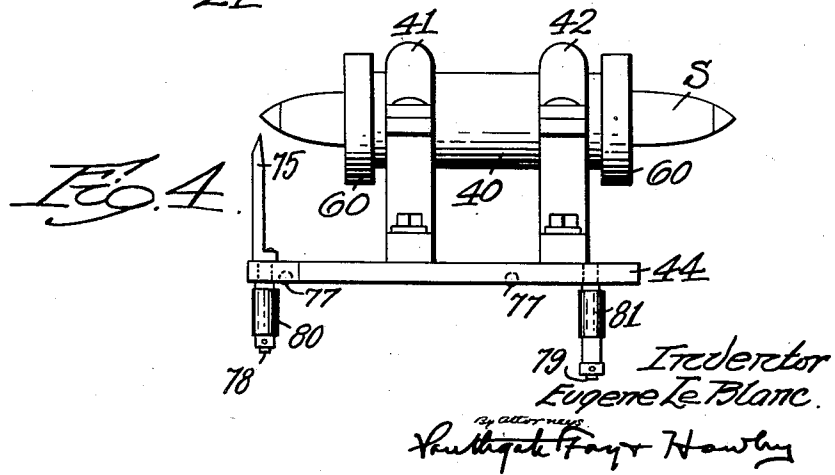
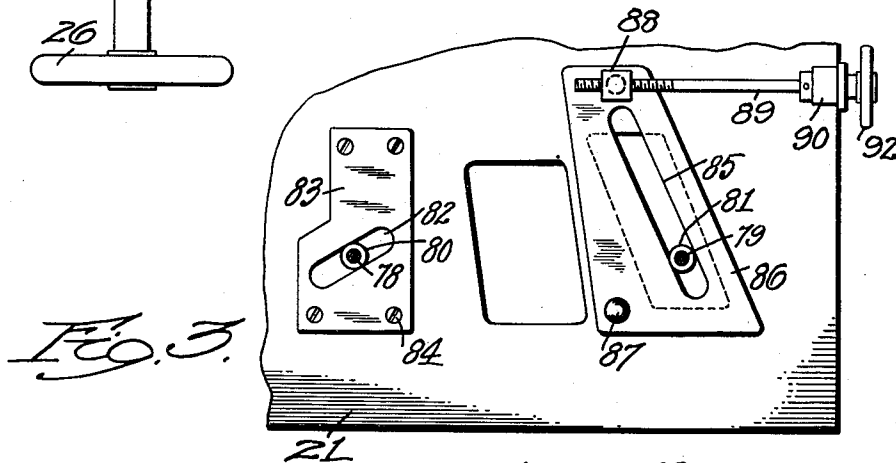
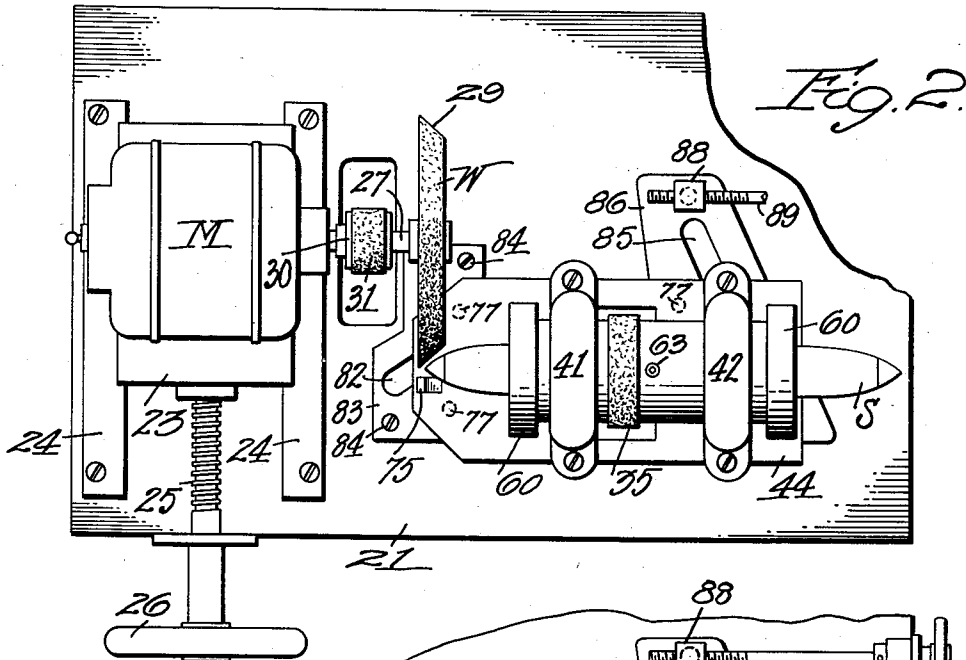
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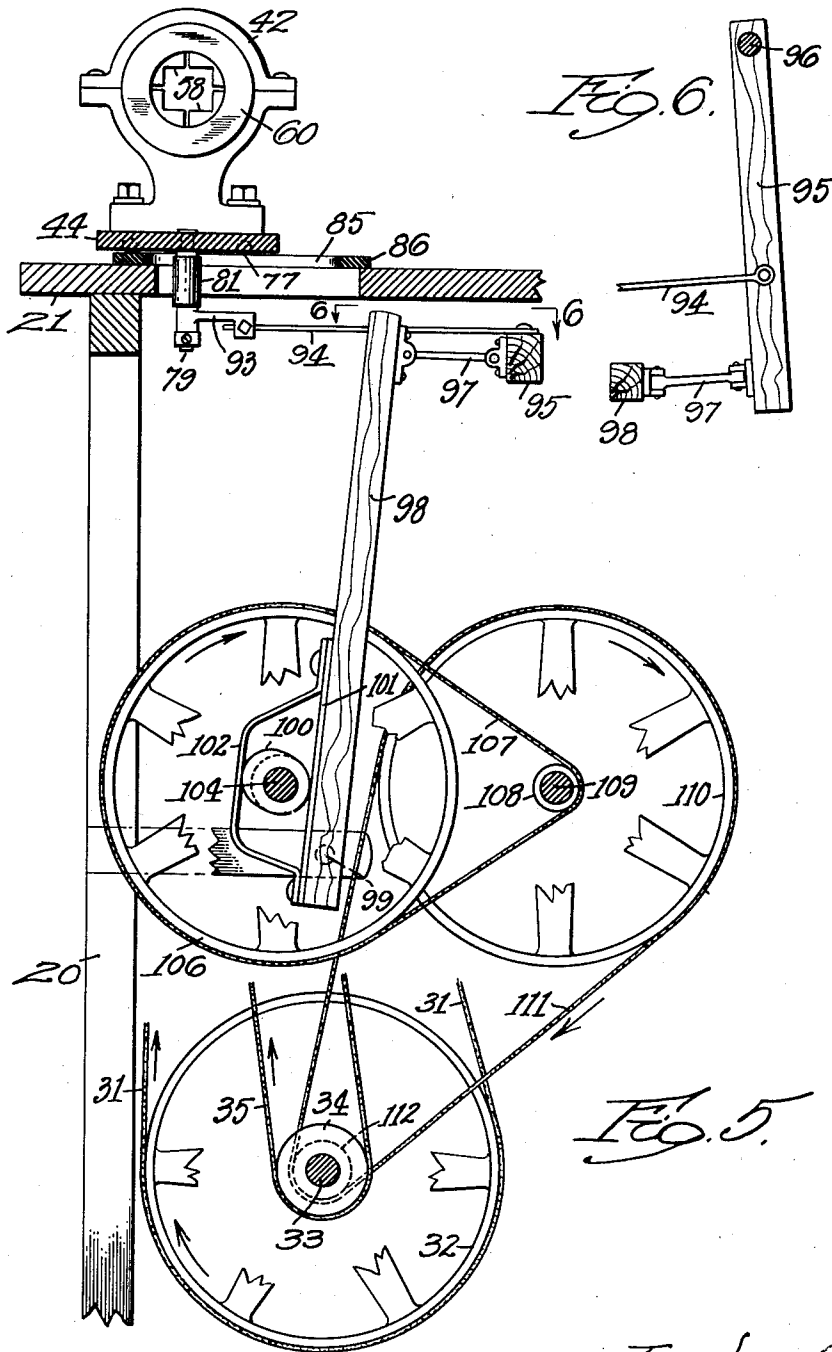
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4 Sheets-Sheet 3



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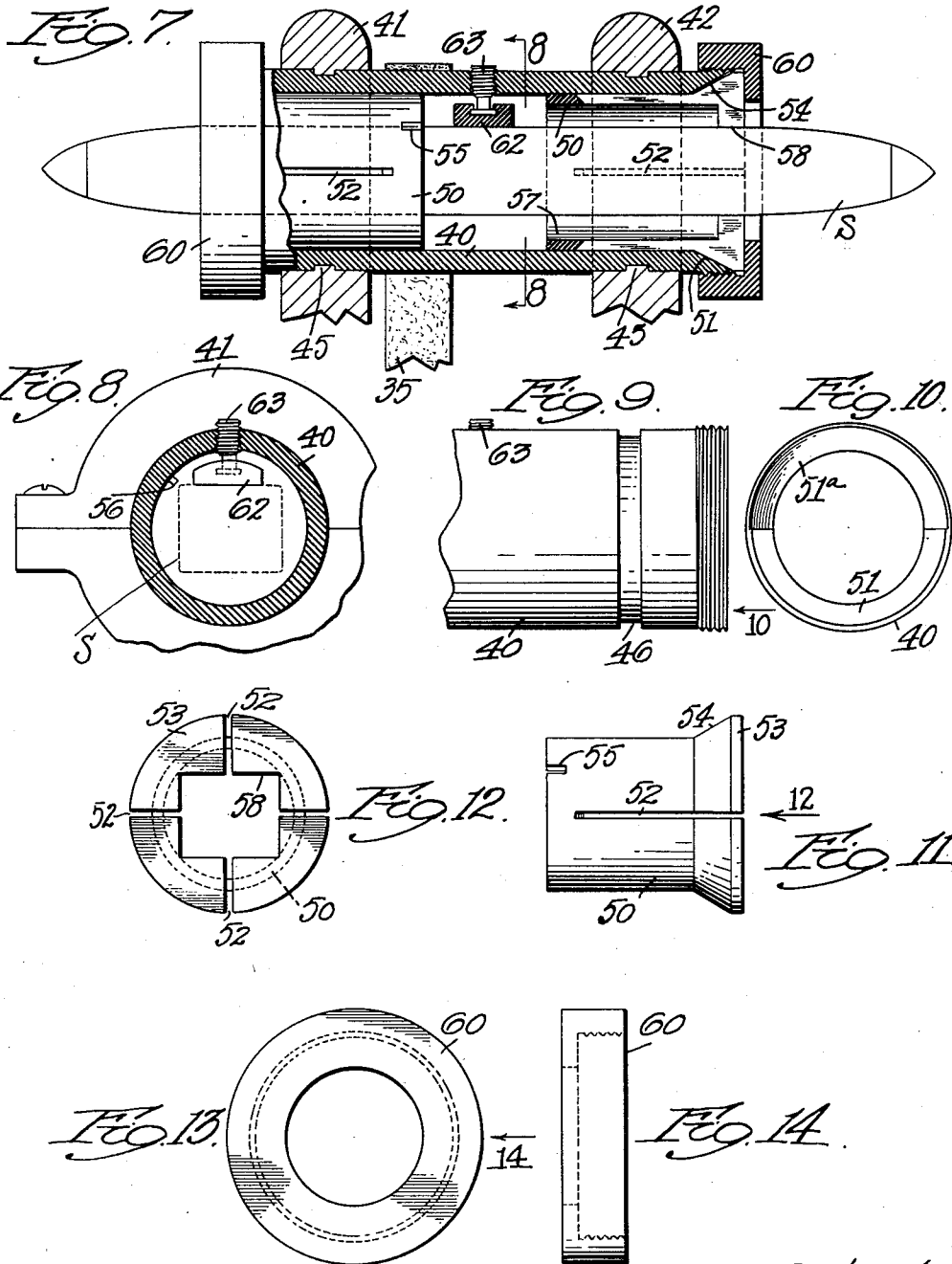
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MACHINE FOR GRINDING SHUTTLE POINTS

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4 Sheets-Sheet 4



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MACHINE FOR GRINDING SHUTTLE
POINTS

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Application April 2, 1934, Serial No. 718,564

8 Claims. (Cl. 51—100)

This invention relates to a grinding machine particularly designed for re-dressing the points of loom shuttles. It is necessary for satisfactory operation that such shuttle points be kept in smooth and well-sharpened condition, as otherwise frequent cutting and breakage of warp threads may occur. Furthermore, these shuttle points are subject to frequent accidental injury, which may be caused by dropping of the shuttles or otherwise.

It is the general object of my invention to provide means to grind or re-dress a dull or injured shuttle point, so that the usefulness of the shuttle may be restored.

A further object is to provide a machine having provision for guiding a shuttle during the grinding operation in such manner that the shuttle point may be given a particular desired shape, such as a surface generally conical but convex in longitudinal as well as transverse section.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a front elevation of my improved grinding machine with certain parts broken away;

Fig. 2 is a plan view thereof;

Fig. 3 is a plan view of certain parts to be described;

Fig. 4 is a front elevation of the shuttle-revolving spindle and associated parts;

Fig. 5 is a sectional end elevation, taken along the line 5—5 in Fig. 1;

Fig. 6 is a detail plan view, taken along the line 6—6 in Fig. 5;

Fig. 7 is a sectional side elevation of the shuttle-revolving spindle;

Fig. 8 is a sectional end elevation, taken along the line 8—8 in Fig. 7;

Fig. 9 is a partial side elevation of the spindle;

Fig. 10 is an end view, looking in the direction of the arrow 10 in Fig. 9;

Fig. 11 is a side elevation of one of the shuttle-holding chucks or collets;

Fig. 12 is an end view, looking in the direction of the arrow 12 in Fig. 11;

Fig. 13 is an end view of one of the chuck-closing rings, and

Fig. 14 is a side elevation, looking in the direction of the arrow 14 in Fig. 13.

Referring to the drawings, my improved grind-

ing machine comprises a base or frame 20 (Fig. 1) supporting a table 21 and provided with a removable door or cover plate 22. A motor M is mounted on a motor base 23, slidable forward and rearward (as viewed in Fig. 1) in guideways 24 (Fig. 2) fixed on the table 21. An adjusting screw 25 and hand wheel 26 is provided for moving the base 23 and motor M along the guideways 24.

A grinding wheel W is mounted on the armature shaft 27 of the motor M, this wheel W preferably having a straight bevel edge as indicated at 29 in Fig. 2. The armature shaft 27 is also provided with a small pulley 30 connected by a cross belt 31 (Fig. 1) to a large pulley 32 on a countershaft 33 mounted in fixed bearings on the frame 20.

A small pulley 34 is connected by a belt 35 to a shuttle-rotating spindle or sleeve 40, the middle portion of which sleeve acts as a drum or pulley for the belt 35. The spindle or sleeve 40 is rotatable in split bearings 41 and 42 which are secured to a base plate 44 movably mounted on the table 21.

The split bearings 41 and 42 are preferably formed with internal ribs or projections 45 (Fig. 7) fitting corresponding annular grooves 46 (Fig. 9) in the spindle 40 and preventing axial movement thereof while permitting free rotation.

Clutch members or collets 50 are slidably mounted in each end of the spindle 40, said spindle or sleeve having internally beveled end surfaces 51 (Fig. 7). The collets 50 are of the split type and preferably have four axially extending slots 52 (Figs. 11 and 12) by which relative expansion and contraction of the collet is permitted.

Each collet also has an enlarged end portion 53 with a conical surface 54 corresponding to the internal conical surface 51 of the sleeve or spindle 40. Each collet is also slotted as indicated at 55 (Fig. 11) to receive a pin 56 (Fig. 8) fixed in the sleeve or spindle 40 and projecting inwardly therefrom.

The cylindrical portion of each collet is recessed as indicated at 57 to clear the shuttle S, while the enlarged end portion 53 of each collet is provided with a rectangular opening 58 (Fig. 12) to receive and centrally locate the shuttle S. The slots 55 and pins 56 hold the collets with the rectangular openings 58 in definite alignment.

A clamping ring 60 is provided for each end of the sleeve or spindle 40, said rings being threaded on the end portions of the spindle and each having an internal end flange to engage the outer face of the enlarged portion 53 of one of

the chucks or collets. By tightening the rings on the spindle, the collets will be forced inward against the bevel surfaces 51, and will be thereby contracted in the usual manner to engage and center the shuttle S.

If desired, a portion 51^a of the bevel surface 51 at each end of the spindle 40 may be slightly cut away to provide clearance, so that variations in height of the shuttles can be taken care of and so that the shuttles will always be located by their bottom or running surfaces.

For additional security, a clamping member 62 (Figs. 7 and 8) is positioned in the sleeve 40 to engage one face of the shuttle S and has a swivel connection with the inner end of a clamping screw 63, threaded in the sleeve 40. The screw 63 is preferably of the socket type and may be adjusted by use of a suitable wrench.

A gauge 75 (Figs. 1 and 2) is mounted on the base 44 which supports the shuttle-revolving spindle, and this gauge furnishes an index by which the point of the shuttle may be accurately located longitudinally.

The spindle is rotated through the belt connections previously described, the speed of rotation being substantially reduced relative to the speed of the wheel W.

I will now describe the special mechanism which I have provided for causing the point of the shuttle to be moved in a predetermined path relative to the beveled edge of the grinding wheel W.

The base 44 (Fig. 4) is provided with recesses on its under side to receive slightly projecting balls 77 which rest on the top surface of the cam plates 83 and 86 and permit easy sliding movement of the base relative to the table. Stud 78 and 79 (Fig. 4) project downward from the base 44 and are provided with rolls 80 and 81. The roll 80 is positioned in a slot 82 (Fig. 3) in a cam plate 83 secured by screws 84 to the table 21. The roll 81 is positioned in a slot 85 in a cam plate 86 pivoted at 87 to the table 21.

The plate 86 is also provided with a swivel post 88 through which is threaded an adjusting screw 89, mounted in a bearing 90 on the table 21 and provided with a hand wheel 92. By turning the hand wheel 92 and the screw 89, the angular position of the cam plate 86 may be adjusted.

An arm 93 (Fig. 5) is pivoted on the lower end portion of the stud 79 and is connected by a link 94 to a lever 95 swinging horizontally about a pivot stud 96 (Fig. 1) projecting downward from the table 21.

The opposite end of the lever 95 is connected by a link 97 (Figs. 5 and 6) to the upper end of an actuating lever 98 pivoted on a stud 99 (Fig. 1) fixed on the frame 20.

An eccentric 100 rotates between a straight wear plate 101 and a U-shaped wear plate 102, both secured to the side of the lever 98. The eccentric 100 is mounted on a shaft 104 (Figs. 1 and 5) and the shaft 104 is provided with a large pulley 106 connected by a belt 107 to a small pulley 108 (Fig. 5) on a countershaft 109.

The shaft 109 is rotatable in bearings on the frame 20 and is provided with a large pulley 110 connected by a belt 111 to a small pulley 112 on the countershaft 33 previously described. Through these connections the eccentric shaft 104 is rotated at greatly reduced speed, relative to the speed of rotation of the wheel W or shuttle S.

As the eccentric 100 is rotated, the actuating lever 98 is oscillated, thus imparting movement

through the link 97, lever 95, link 94 and arm 93 to the stud 79 projecting downward from the base 44 through the slot 85.

As the stud 79 and roll 81 are thus moved forward and rearward along the slot 85, the stud and roll also receive a component of movement axially of the wheel shaft 27, and the stud 78 and roll 80 are simultaneously moved along the fixed slot 82.

The base 44 thus receives a compound movement which causes the point of the shuttle S to move past the beveled edge of the wheel W on such a curve as to cause the point to be ground with the desired general conical effect but with an additional convex longitudinal curvature.

The exact curved surface produced may be varied as desired by adjusting the position of the cam plate 86 and slot 85.

By the described mechanism the shuttle S is thus rotated at relatively slow speed and is moved in a horizontal plane in the desired manner relative to the edge of the grinding wheel. The hand wheel 26 may be used to adjust the wheel W toward the point of the shuttle as the edge of the wheel wears away in use.

Having thus described my invention, it will be seen that I have provided mechanism by which a shuttle may be accurately centered in a shuttle-revolving spindle, and by which it may be reciprocated along a predetermined path relative to the edge of a grinding wheel, so that the point of the shuttle may be re-dressed and so that the resulting surface may be of the desired contour.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. A shuttle grinding machine comprising a grinding wheel, a support therefor, a shuttle-rotating spindle, a separate support for said spindle, a pair of cam plates mounted in fixed position, means to move said spindle support, and contact elements on said spindle support engaging said cam plates and guided thereby to cause the spindle point to move along a predetermined curved path during the grinding operation.

2. A shuttle grinding machine comprising a grinding wheel, a support therefor, a shuttle-rotating spindle, a separate support for said spindle, means to rotate said wheel and spindle, a pair of cam plates mounted in fixed position, means to move said spindle support, contact elements on said spindle support engaging said cam plates and guided thereby to cause the spindle point to move along a predetermined curved path during the grinding operation, and means to vary the relative position of said cam plates.

3. A shuttle grinding machine having a table, a grinding wheel, a support for said wheel, a shuttle-rotating spindle, a separate support for said spindle movably mounted on said table, a pair of slotted plates mounted on said table, studs on said spindle support, rolls on said studs positioned in said slots, and means to move said spindle support, said rolls and slots co-acting during such movement to determine a combined movement of said support and to cause the point of the shuttle supported in said spindle to follow a predetermined curved path.

4. A shuttle grinding machine having a table, a grinding wheel, a support for said wheel, a shuttle-rotating spindle, a separate support for said spindle movably mounted on said table, a pair of slotted plates mounted on said table, studs on

said spindle support, rolls on said studs positioned in said slots, means to move said spindle support, said rolls and slots co-acting during such movement to determine a combined movement of said support and to cause the point of the shuttle supported in said spindle to follow a predetermined curved path, and means to change the angular position of one of said plates on said table.

5 In a shuttle grinding machine, a shuttle-rotating spindle, a support therefor, a regularly actuated lever, swivel connections from said lever to said support, and cam means effective to modify the movement of said support caused by said actuating lever, said cam means causing different portions of said support to move along different and angularly disposed paths.

10 6. In a shuttle grinding machine, a shuttle-rotating spindle, a support therefor, a regularly actuated lever, swivel connections from said lever to said support, cam means effective to modify the movement of said support caused by said actuating lever, said cam means causing different portions of said support to move along different and angularly disposed paths, and means to change the position of one of said paths.

20 25 7. A shuttle driving machine comprising a grinding wheel, a hollow work spindle, means to receive and hold a loom shuttle of rectangular

cross section in substantially axial position in said spindle, separate bearing supports for said wheel and spindle, one of said supports remaining fixed during a grinding operation, means to rotate said wheel and spindle, and means including an actuator and cam devices effective to move the other support to develop a predetermined longitudinally convex surface on the point of a shuttle supported in said hollow spindle during a grinding operation thereon.

10 8. A shuttle driving machine comprising a grinding wheel, a hollow work spindle, means to receive and hold a loom shuttle of rectangular cross section in substantially axial position in said spindle, separate bearing supports for said wheel and spindle, one of said supports remaining fixed during a grinding operation, means to rotate said wheel and spindle, and means to give that end of the other support which is more remote from the grinding wheel a combined longitudinal and transverse movement, and cam means at the opposite end of said support effective to modify said combined movement at said opposite end and to cause the grinding wheel to develop a predetermined longitudinally convex surface on the point of a shuttle supported in said hollow spindle during a grinding operation thereon.

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