Oct. 10, 1933. J. G. BENTLEY ET AL 1,930,073

SHUTTLE TRUING MACHINE

Filed Nov. 22, 1930 3 Sheets-Sheet 1

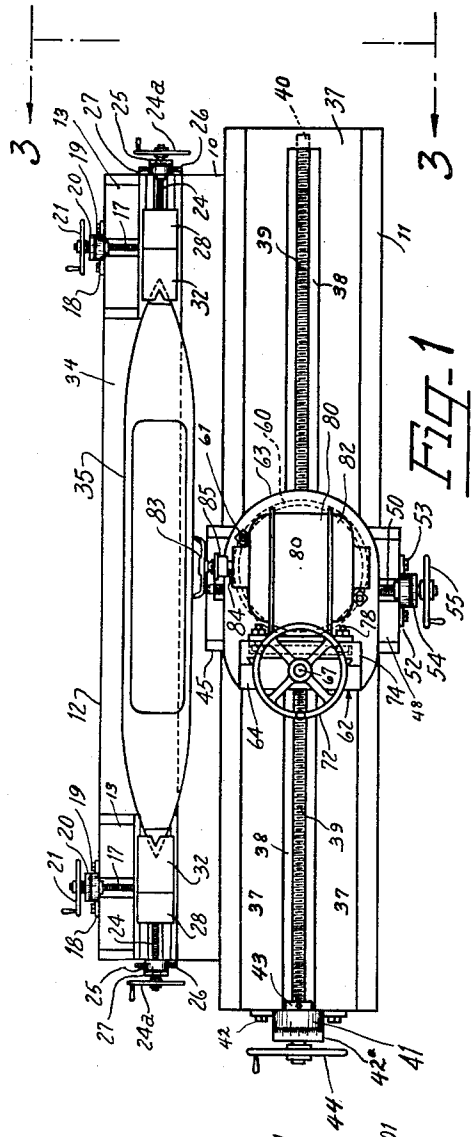


FIG. 1

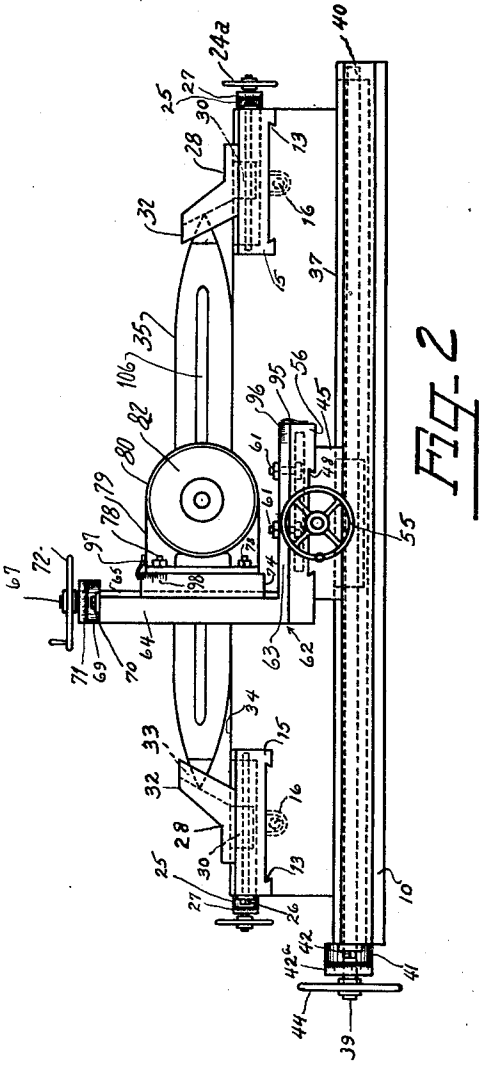


FIG. 2

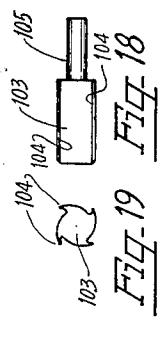


FIG. 18

FIG. 19

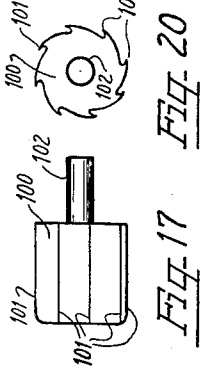


FIG. 20

FIG. 17

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SHUTTLE TRUING MACHINE

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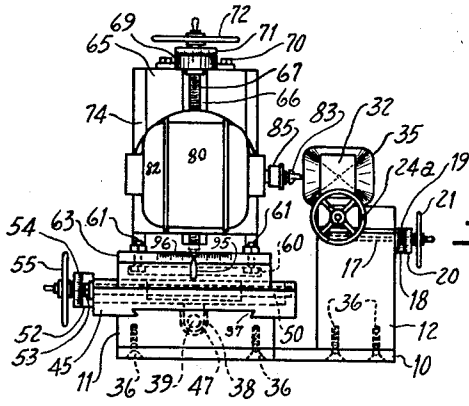


Fig. 3

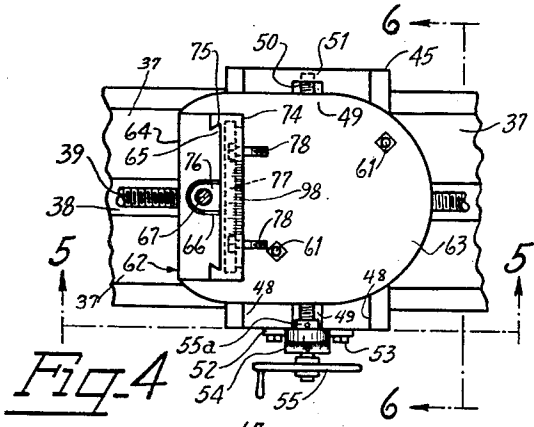


Fig. 4

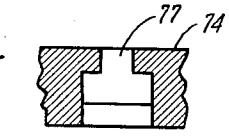


Fig. 7

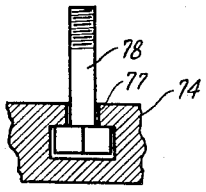


Fig. 8

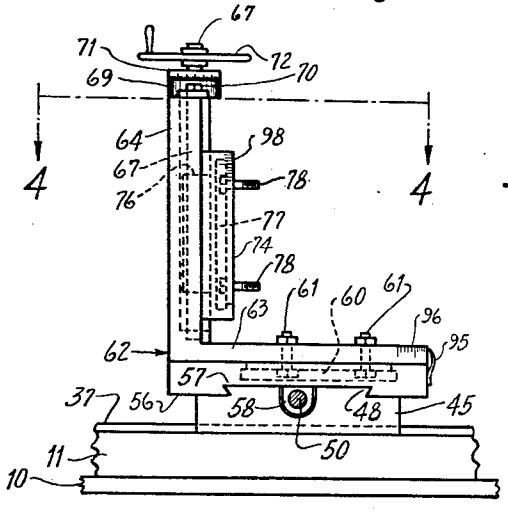


Fig. 5

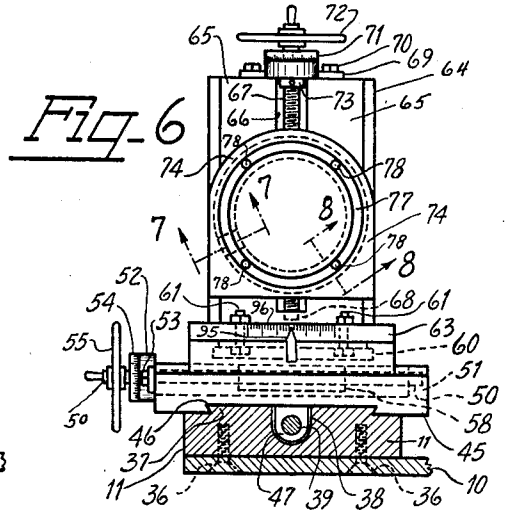


Fig. 6

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SHUTTLE TRUING MACHINE

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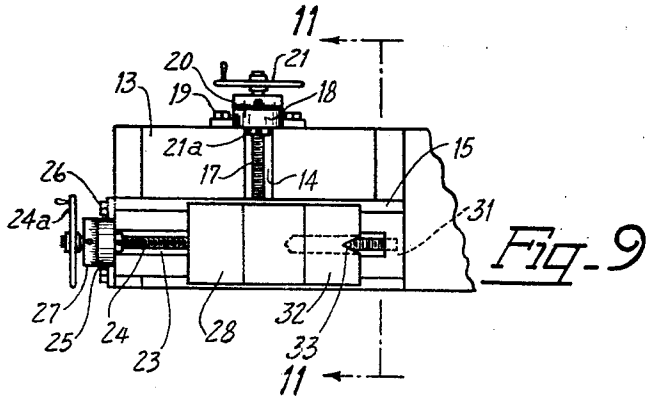


Fig-9

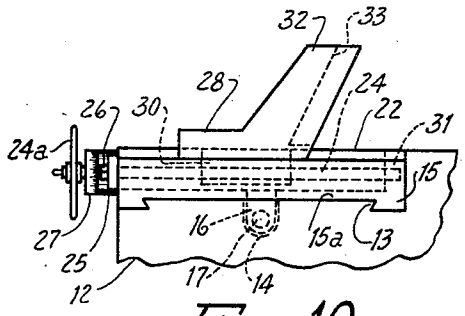


Fig-10

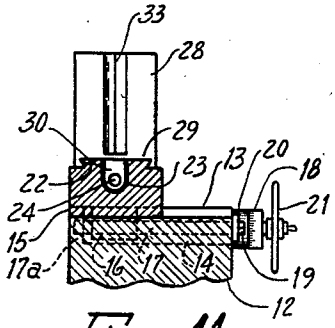


Fig-11

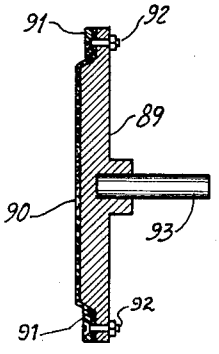


Fig-12

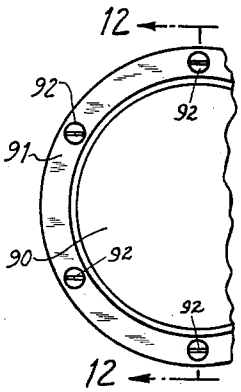


Fig-13

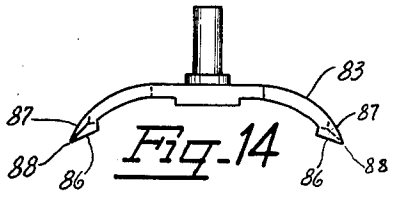


Fig-14

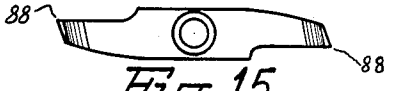


Fig-15

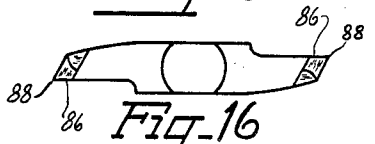


Fig-16

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Patented Oct. 10, 1933 1,930,073

UNITED STATES PATENT OFFICE

1,930,073

SHUTTLE TRUING MACHINE

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Application November 22, 1930
Serial No. 497,425

2 Claims. (Cl. 144—2)

This invention relates to a machine for truing shuttles and more especially to means for adjustably holding a shuttle while a cutting tool is moved along the side thereof to true up the sides of the shuttle, and an object of this invention is to produce a portable device which may be easily understood and operated and which may be produced at a very low cost.

It is a well known fact that the constant reciprocating movement of the shuttle as it travels back and forth in the lay has a tendency to wear the bottom and side portions of the shuttle so that it becomes necessary to frequently true up the shuttle in order to bring the worn bottom and side portions back again to occupy a plane which is parallel with the longitudinal center of the shuttle. It is well known that as a usual rule the shuttle wears more near each end than in the central portion and this leaves the center somewhat full or rounded which causes the shuttle to wabble and vibrate in its travel instead of describing a straight line in traveling from one end of the lay to the other.

The present invention relates to a machine for truing the running faces or treads of loom shuttles which in use wear down more or less unevenly and must be brought down to cause the faces thereof to occupy a plane which is parallel to the longitudinal center of the shuttle, in order to insure easy and accurate running and proper cooperation with the picker motion.

Also it is a well known fact that shuttles when purchased in a new condition sometimes do not have the side and bottom portions occupying a plane which is parallel to the longitudinal center of the shuttle and therefore, must be trued up in order to perform properly and this truing operation both in the manufacture of new shuttles and in the truing of old shuttles is done largely by hand which results in inaccuracies which cause the differently leveled shuttle points to attack the pickers at different points and which defect is especially noticeable where two pickers are used alternately in which case these inaccuracies eventually cause big holes to be worn out of the picker faces and the shuttles also suffer and the quality of goods turned out is also affected.

In truing up shuttles for use in a loom, it is desirable that all shuttles for the same loom be exactly the same size, weight, and bevel so that when one shuttle is substituted for another that there will be no appreciable difference in the tension and texture of the woven fabric.

In the present invention a cutting tool may be employed which has embodied therein a certain amount of resiliency to produce a scratching effect so as to cause the cutting tool to cut a perfectly straight line regardless of the density of the wood or other material from which the shuttle is made, and by providing means for adjustably holding the shuttle in a proper position and by providing a rotatable cutting tool which is adapted to scratch the sides or bottom portion of the shuttle which is turned against the cutting tool, it thereby enables the operator to cut the surface of the shuttle in a perfectly straight line because if the tool is affected by the density of the wood said tool will be held in position and its speed will be regulated with relation to the shuttle so as to cause all portions of the surface of the shuttle to be cut to a predetermined depth, thus insuring a plane surface for the side and bottom portions of the shuttle, and in this way it insures uniformity in the size of the shuttles.

In using this shuttle truing machine hereinafter set forth it is possible to order shuttles over-size and true them up in this machine so as to cause them to fit a designated loom perfectly and also to cause each shuttle to be a duplicate of the other as to weight, size, and general characteristics.

Some of the objects of 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 plan view of the shuttle truing machine;

Figure 2 is a side elevation looking from the lower side of Figure 1;

Figure 3 is an end elevation looking from along the line 3—3 in Figure 1;

Figure 4 is a plan view, partially in cross-section, taken along the line 4—4 in Figure 5;

Figure 5 is a view, partly in cross-section, taken along the line 5—5 in Figure 4;

Figure 6 is a view taken along the line 6—6 in Figure 4;

Figure 7 is an enlarged detailed cross-sectional view taken along the line 7—7 in Figure 6;

Figure 8 is an enlarged detailed cross-sectional view taken along the line 8—8 in Figure 6;

Figure 9 is a plan view of the adjusting mechanism shown in the upper left hand corner of Figure 1;

Figure 10 is a side elevation of the mechanism shown in Figure 9 looking from the lower side of Figure 9;

Figure 11 is a view taken along the line 11—11 in Figure 9;

Figure 12 is a cross-sectional view taken along the line 12—12 in Figure 13;

Figure 13 is a face view of a portion of an abrasive wheel adapted to be used in the mechanism;

Figure 14 is a plan view of the scratching or cutting tool as it appears when looking from above at the tool while it is in operative position.

Figure 15 is a view of the cutting tool looking from a point between the motor and the cutting tool;

Figure 16 is a face view of the cutting tool looking from a point occupied by the plane of the side of the shuttle;

Figure 17 is a view of a milling tool for cutting bobbin cavities in a shuttle;

Figure 18 is a milling tool for cutting thread groove in side of shuttle, and can also be used for milling other cavities.

Figure 19 is an end view of Figure 18;

Figure 20 is an end view of Figure 17.

Referring more particularly to the drawings, the numeral 10 indicates a base portion which has secured thereon a track member 11 and a shuttle supporting member 12. Track member 11 and shuttle supporting member 12 may be secured to said base member 10 by means of screws 36 or otherwise, if desired or members 10, 11, and 12 can be integral with each other.

At each end of the member 12 there is a cut away portion for supporting the adjustable mechanism for holding the ends of the shuttle while it is being operated upon. As both ends are identical like reference characters will apply to the parts on both ends of the member 12. Integral with portion 12 is a tenon or track portion 13 and disposed transversely of member 12 is a groove 14. A member 15 is provided having a mortise track-way 15*a* in the lower portion thereof, said mortise 15*a* and tenon 13 forming means for lateral adjustment of member 15 with relation to member 12. Member 15 has a downwardly projecting lug 16 which travels in groove 14, and a screw 17 threadedly pierces the projection 16 and has one end thereof loosely mounted in a bore in the member 12 at the end of groove 14 as at 17*a*, as groove 14 does not pass all the way across member 12. At the other end of groove 14 a member 18 is secured to member 12 by means of screws 19 and the screw 17 passes through this member 18 but the rod is not threaded at the point where it passes through member 18. Adjustably secured on rod 16 is a graduated member 20 for purposes of determining the amount of lateral adjustment which may be imparted to member 15 by means of screw 17. A hand wheel 21 is secured on the end of screw 17 for purposes of operating the same. A collar 21*a* is fastened on rod 17 to hold the same in position.

Member 15 has on the upper surface thereof a tenon track member 22 and a groove 23 disposed longitudinally thereof with a screw 24 disposed therein, screw 24 has a hand wheel 24*a* on the end thereof, said screw being loosely mounted in member 25 which is secured to member 15 by means of screws 26 and adjustably mounted on screw 24 is a graduated rotatable member 27 which can be fixedly secured to the screw if desired for determining the amount of longitudinal adjustment imparted to member 28, which member 28 has a mortise on the lower surface thereof, said mortise being indicated by reference character 29 which mortise is adapted to fit over the tenon 22. This member 28 has a projection 30 thereon which projects downwardly into groove 23 and is threadably pierced by screw 24, said screw 24 being loosely mounted as at 31 in member 15. This member 28 has the upwardly and inwardly projecting portion 32 and in the face portion of the upwardly projecting portion 32 is a V shaped groove 33 into which the point of the shuttle is adapted to fit.

Member 12 between the adjusting mechanism at the ends thereof, which has just been described, has a plane surface on the upper portion thereof indicated by reference character 34 on which plane portion the shuttle is adapted to rest while being held by the adjusting mechanisms at each end thereof which have been described. This shuttle is indicated by reference character 35.

Track member 11 which has been previously referred to and there stated as being integral with face 10 can be made integral or secured to face 10 by means of suitable screws 36 if desired, and this track member has a tenon 37 on the upper surface thereof forming a track-way and a longitudinal groove 38 is provided, in which groove is disposed a screw 39, one end of said screw being loosely mounted in the closed end of the groove as at 40 and the other end of said rod being loosely supported in member 41 secured on member 11 by means of screws 42. A collar 43 is secured on this threaded rod 39 to hold the same in position. Adjustably mounted on rod 39 is a graduated member 42*a* by means of which travel of carriage 45 can be measured. A hand wheel 44 is secured on the outer end of said threaded rod 39 for purposes of rotating the same.

Slidably mounted on member 11 is a member 45 which has a mortise 46 on the lower surface thereof adapted to engage tenon 37 on member 11 and this member 45 has a downwardly projecting portion 47 which has an interior threaded hole therethrough, through which threaded rod 39 passes and by means of which arrangement longitudinal movement may be imparted to member 45 with relation to member 11. This member 45 has a tenon 48 on the upper surface thereof and has a longitudinal groove 49 therein in which a threaded rod 50 is mounted, one end of said threaded rod being loosely mounted in the closed end of said slot as at 51 and the other end of said rod is supported by member 52 which is secured to member 45 by means of screws 53. A graduated member 54 is adjustably secured to rod 50 and a hand wheel 55 is secured to the outer end of said threaded rod 50. A collar 55*a* is secured on rod 50 to hold the same in position. A member 56, having a mortise 57 in the lower surface thereof adapted to engage tenon 48 is mounted on member 45. This member 56 has a downwardly projecting member 58 projecting into slot 49 and through which projection 58 and rod 50 being a threadable engagement so that by rotation of rod 50 movement can be imparted to member 56 with relation to member 45. This member 56 in the upper surface thereof has a radially disposed groove 60, which groove is T-shaped in cross-section similar to the structure shown in Figures 7 and 8 and in this T-shaped groove a plurality of bolts 61 are adjustably secured and project upwardly above the upper surface of member 56.

An L-shaped member 62 is adapted to be adjustably secured on top of member 56 by means of the bolt 61 piercing holes in the plane portion 63, and this member 62 has a vertically disposed

groove 66 with a threaded rod 67 disposed in said groove and loosely mounted in the bottom portion thereof as at 68. This rod is also loosely mounted in member 69 secured on top of member 64 by means of screws 70. An adjustable graduated member 71 is mounted on screw 67 and a hand wheel 72 is secured on the upper end of said screw 67, while a collar 73 is secured on screw rod 67 to prevent it being withdrawn from the position shown in the drawings. Slidably mounted on member 64 is another member 74 which has a groove or mortise 75 in the surface thereof which is adapted to engage the tenon 65 on member 64. This member 74 has a projection 76 which projects into the groove 66 and is threadably pierced by screw 67 so that vertical adjustment of member 64 may be effected by rotation of threaded rod 67. On the other face portion of member 74 there is a radial groove 77 which is T-shaped in cross-section as shown in Figures 7 and 8 and a plurality of bolts 78 are adapted to be placed in this radial T-shaped groove and these bolts are adapted to pierce the base 79 of the motor housing 80, said bolts having suitable nuts 81 thereon so that the motor 82 together with its housing 80 can be adjusted by loosening bolts 78 for bringing about an adjustment of motor 80 and cutting tool 83 associated therewith with respect to the horizontal. This motor 82 has a motor shaft 84 and a chuck 85 on the end thereof adapted to receive cutting tool 83 or any other suitable working tool.

The cutting tool 83 has cutting surfaces 86 and 87 meeting at a point 88 and it is seen by referring to Figure 14 that these cutting surfaces coming to a point 88 perform a scratching effect on the surface of the shuttle. Also due to the formation of the cutting tool there is a certain amount of resiliency in the same so that when the cutting tool engages a rigid or dense portion of the surface of the shuttle it can be passed back and forth along that point until the wood or other material is cut away to a predetermined depth, so that when the motor is passed along the entire side of the shuttle that side of the shuttle will be perfectly straight. If desired, threaded rod 39 can be dispensed with and removed by loosening collar 43 and unscrewing the same and operating the motor and cutting tool by pushing it along by hand.

The portion 63 has degree graduations 96 thereon adapted to cooperate with pointer 95 on the member 56 to indicate the position of motor horizontally.

The member 74 has an arc-shaped upper portion on which are degree graduations 98 which are adapted to cooperate with pointer 97 on the base of motor support 79 to indicate adjustment of motor from a horizontal plane.

The structure set forth in the drawings can also be used for performing other operations on shuttles as will be observed by reference to Figures 17 to 20, inclusive. Figures 17 and 20 show a cutting or milling tool 100 which can be substituted for tool 83, and with tool 100, having cutting edges 101 a bobbin cavity can be cut in a shuttle or an old cavity made longer if desired. This tool 100 has a shaft 102 for insertion in chuck 85.

In Figures 18 and 19 there is shown a smaller cutting tool 103, having cutting edges 104 and a shaft 105 for insertion in chuck 85, and with smaller tool 103 the thread groove 106 may be cut in the side of a shuttle or old groove reworked.

It is also evident that with tool 103 various cavities may be formed or re-worked in the shuttle because the motor can be adjusted vertically and laterally with respect to the shuttle and also the angle of the working tool can be changed to any desired position.

It is also evident that either of these cutting tools 100 or 103 can be used for finishing the noses of the shuttles due to the universal adjustment of which the motor and working tools are capable.

The method of operation of the shuttle truing machine is as follows

A shuttle is placed on the surface 34 after one of the wheels 24*a* has been rotated to draw the member 28 far enough away from plane portion 34 to allow the shuttle to enter and then this wheel is rotated in opposite direction to cause the shuttle to be held firmly by its points and to be held against the plane surface 34. Then the wheels 21 can be rotated to set the shuttle at the proper point and after this operation the motor and motor housing and the working tool will be moved to the extreme right hand in Figures 1 and 2 and then the motor with its working tool can be moved to the left hand by means of the threaded rod 39 if desired, or this rod can be disconnected and the motor can be pushed along by hand at whatever speed is desired to plane off this surface of the shuttle and then the shuttle can be removed and another side turned toward the working tool and the operation repeated. If desired the working tool 83 can be removed and the sand wheel 89 can be substituted for giving a high polish to the surface but due to the peculiar cutting action of the cutting tool 83, it is not absolutely necessary as the cutting tool 83 imparts a smooth surface to the side of the shuttle.

If it is desired to plane the beveled end portions of the shuttle, one of the members 28 can be adjusted out further and the cutting tool can be placed in a position near the end of the shuttle and the adjustment of the motor between plates 56 and 63 and also the adjustment between the motor base 79 and plate 74 can be set so as to cause the cutting tool to operate on the end portions of the shuttle and this can be further adjusted by feeding the motor and the cutting tool against the shuttle by means of wheel 55 if desired.

Also by means of adjusting the angularity of the motor with relation to the horizontal the working tool can be adjusted to suit various parts of shuttles, and various types of shuttles.

It has been found by experience that by using cutting tool shown in Figures 14, 15 and 16 and driving the same at between ten and fifteen thousand revolutions per minute that a smooth surface is imparted to the shuttle, but in case it should be desired to polish this surface or to render it smoother an abrasive wheel 89 can be employed which abrasive wheel has a covering of sand paper or other abrasive material indicated by reference character 90 secured thereon by means of ring 91 held in position by means of bolt 92. This sand wheel, of course, is provided with a shaft 93 for insertion into chuck 85.

After a shuttle has been secured in position it is evident that in order to adjust one end laterally it is necessary to loosen up on one of the hand wheels 24*a*, for the angle of the grooves in relation to plane 34 holding the noses of the shuttle exert a downward pressure to hold the shuttle against plane surface 34.

It is also evident that member 28 can be adjusted longitudinally of the member 12 to take care of different lengths of shuttles.

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 set forth in the appended claims:

We claim:

1. In a shuttle truing machine, a base member, a trackway disposed longitudinally of the base member, a support mounted on said trackway, a threaded rod disposed in said trackway and threadably penetrating said support for movement of said support along the trackway, said support having a trackway disposed transversely thereof, a second support mounted on said first support, a threaded rod mounted on the first support and engaging said second support for adjusting said second support laterally with respect to the first support, a member mounted on the second support and having an upstanding projection, a vertically disposed trackway on said upstanding projection, a motor mount disposed on said trackway, a threaded rod mounted in said upstanding projection and threadably penetrating said motor mount for adjusting said motor mount vertically with relation to the projection, means for rotatably and adjustably mounting said member on said second support, a cutting tool driven by said motor, means at each end of the base for supporting the ends of the shuttle, means for adjusting said supporting means longitudinally of the base independently of each other and means for adjusting said supports for the ends of the shuttle laterally of the base independently of each other.

2. In a shuttle truing machine, a base member, a trackway disposed longitudinally of said base member, a support mounted on said trackway and being movable longitudinally along said base member, a second support mounted on the first support and being moved laterally with relation to the base member, an L-shaped member having one leg adjustably mounted on said second support and being adapted to be rotated on said second support around a vertical axis, means for adjusting said L-shaped member in position, after being rotated around a vertical axis, a vertically disposed trackway on said L-shaped member, a motor mount disposed on said trackway, means for adjusting said motor mount vertically on said trackway, an electric motor, means for securing said electric motor on said motor mount for adjustment along a horizontal axis with relation to the base, separated means on the base for supporting each end of the shuttle, means for adjusting said supporting means longitudinally of the base independently of each other and means for adjusting each of said supporting means laterally of the base independently of each other.

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