Nov. 29, 1927. 1,650,863

E. F. BUTTS

DOUBLE BELT SANDING MACHINE

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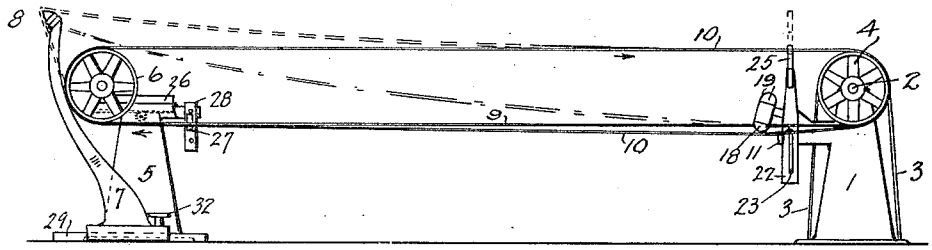


Fig. 1

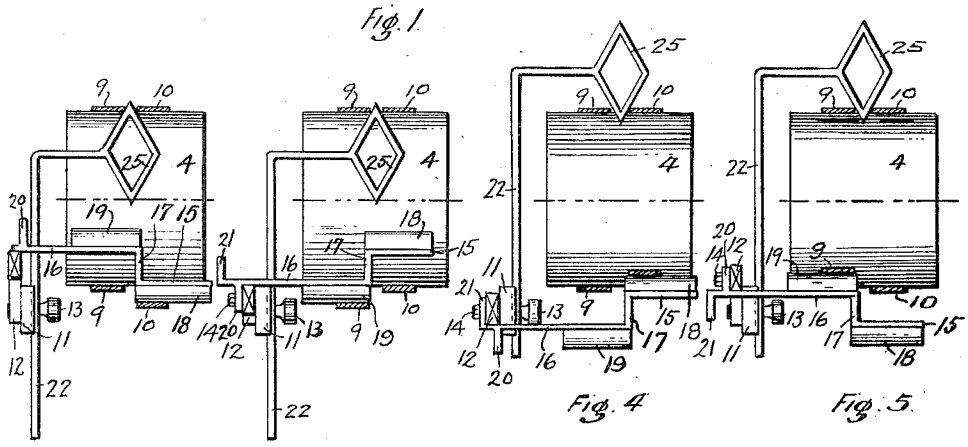


Fig. 2 Fig. 3 Fig. 4 Fig. 5

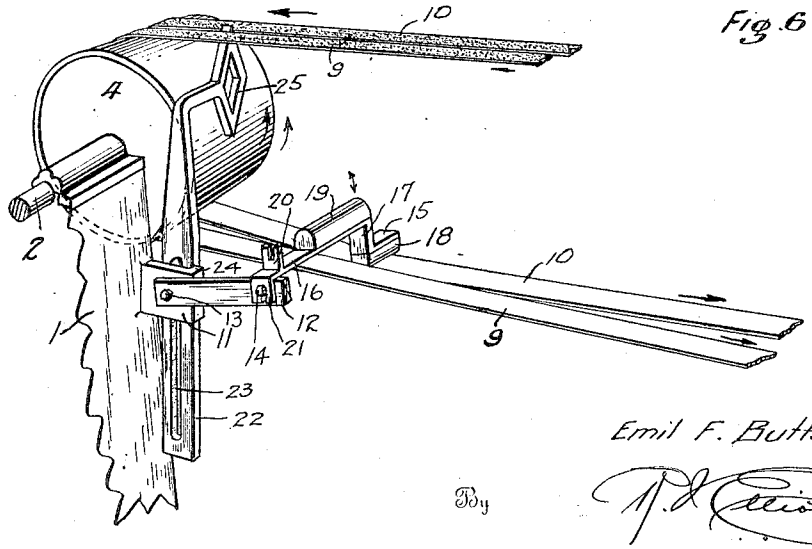


Fig. 6

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Fig. 7.

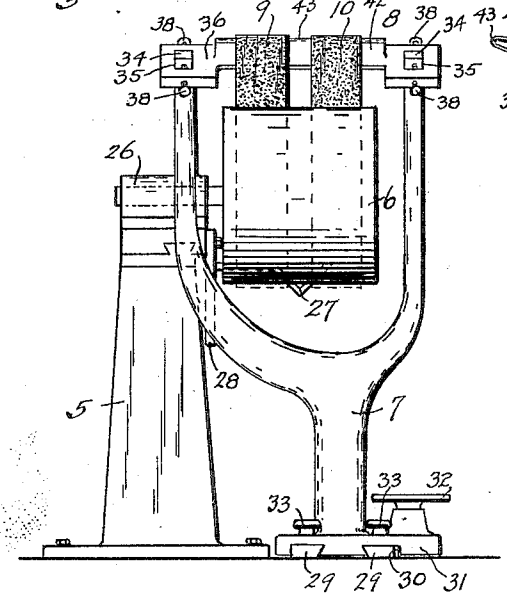
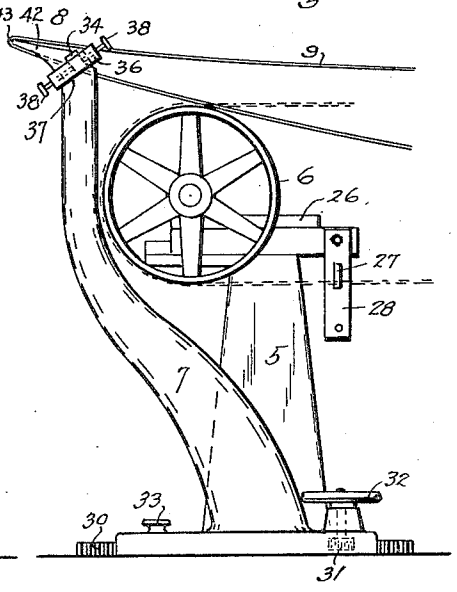


Fig. 8.



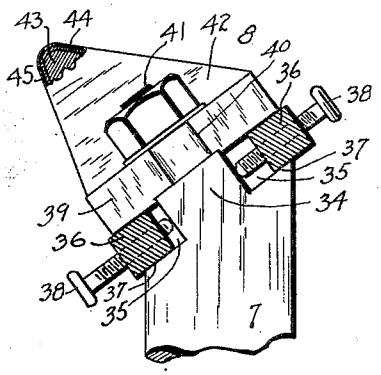


Fig. 9

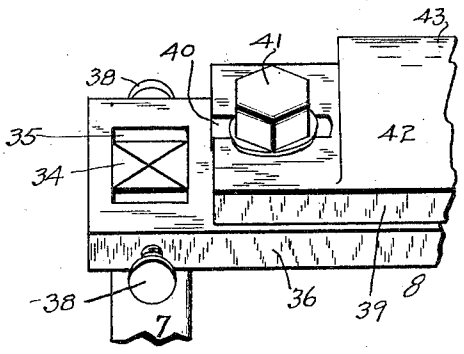


Fig. 10.

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UNITED STATES PATENT OFFICE.

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DOUBLE-BELT SANDING MACHINE.

Application filed August 20, 1925. Serial No. 51,370.

This invention relates to woodworking machines and especially to that class known as belt sanders which are adapted to smooth the surface of flat or curved wood. The purpose of my invention is to provide a means wherein two sanding belts, one coarse and the other fine, may be used together whereby both the roughing and finishing of the wood may be done at a single handling of the wood. In order to accomplish this general purpose the objects of this invention are to provide means for keeping the belts separate on the same pulley; means for taking up the slack in either of the belts, should one stretch more than the other; both said means to be adapted for use whether the sanding surface of the belts face outward or inward; means for adjusting the spindle sander attachment whereby the tracking of the belts thereon may be controlled; means for changing the tension of the belts on the spindle sander; and means whereby the belts may be operated around a much sharper curve on the spindle sander than has heretofore been possible. Other objects are to provide such a machine which can be readily set up in a factory; which is cheap to build, strong and rigid in construction, easy to operate, and which effects a very great saving in the cost of the work which it performs over previous costs thereof.

I attain these and other objects by the devices, mechanisms, and arrangements illustrated in the accompanying drawings, in which—

Fig. 1 is a side view showing my machine in use as a double belt sander, showing also in dotted lines, the positions of the two belts when used as a spindle sander; Figs. 2, 3, 4 and 5 are cross-sections adjacent the driving pulley thereof, to illustrate the positions of the various parts when the sanded surface faces outward (Figs. 2 and 3) or inward (Figs. 4 and 5), or when the right-hand belt (Figs. 2 and 4) or the left-hand belt (Figs. 3 and 5) is loosest; Fig. 6 is a perspective view of the parts in the same positions as shown in Fig. 2; Fig. 7 is an end elevation of the spindle sander end of the machine, showing it arranged for sanding a very sharp curve; Fig. 8 is a side elevation thereof; Fig. 9 is a side elevation, partly in section, of a spindle sander attachment, to illustrate its adjustment in the machine to control the tracking of the belts thereon; and Fig. 10 is an elevation thereof.

Similar numerals of reference refer to similar parts throughout the several views.

Belt sanding machines have usually been of two main types; a long belt sanding machine in which the wood to be smoothed is flat and laid on a table under the sanded surface of the belt which is pressed down thereon manually, and a short belt sanding machine, usually with the surface of the belt vertical, at one end of which the belt bends around a fixed vertical edge, or spindle attachment, against which a curved surface may be pressed. In my machine I have combined these two types into a single machine thereby economizing in equipment and in floor space occupied thereby besides producing a machine capable of doing work heretofore impractical in any belt sander. Further, it has been found impossible to operate a short-belt spindle sander when the spindle attachment gives a sharp corner to turn, for smoothing small inward curves because, when the belt is short it must be made very tight and when it is tight it will quickly wear itself and the spindle attachment out and therefore is of no practical value, but I have found that when the belt is long, as in my machine, the belt need no longer be tight but that sufficient traction may be had when it is quite loose, and under these conditions it easily turns a very sharp spindle attachment, even sharp enough to smooth a groove or inward curve an eighth of an inch across, thus my machine is enabled to do work which has hitherto been done entirely by hand at great cost. Again, it has been found impractical to attempt to run two belts on the same machine because one would stretch more than the other, even when cut the same length, and because one would climb on top of the other when passing over the pulley, and my machine overcomes both of these difficulties and thus enables a coarse and a fine sand belt to be run side-by-side so that the wood may be roughed and then finished with the same handling, thus accomplishing a further saving in the cost of manufacture of all parts on which the machine is used. Also, on spindle sanders, I have found it to be of great practical importance to provide a means of adjusting the position and angle of

the spindle sanding attachment in order to control the tracking of the belts thereon.

Referring now to the drawings:—this machine is provided with a fixed pedestal 1, on which the driving shaft 2, rotated by a belt 3 or other suitable means, is mounted and carries a broad drive pulley 4 thereon. At the other end of the machine, at a distance of some twelve or more feet, is mounted a second fixed pedestal 5 on which the idle wheel 6 is adjustably mounted, as hereinafter described, and also a third pedestal 7, adjustable in distance from the driving pulley 4 and carrying a removable and adjustable spindle sanding attachment 8 at its upper end. Between these two ends I mount the two sanding belts 9 and 10, each passing over the driving pulley 4 and either over the idle pulley 6 or the spindle attachment 8, or both of them. The belts 9 and 10 are of the usual sand belt construction and may have their sanded surfaces inward or outward, as desired, except that when the spindle attachment 8 is used, the sanded surfaces will always be outward for obvious reasons.

It is practically impossible to mount these belts with exactly equal tension in them and it is therefore necessary to provide a means for increasing the tension of the slackest by forcing it to traverse a slightly longer path than the other belt. This is accomplished by pressing the fabric or unsanded side of the longest belt vertically out of the normal path as illustrated in Figs. 1 to 5, inclusive, at a point adjacent the driving pulley 4 and engaging the belt after it leaves the said pulley 4. In order to accomplish this I use the following device:—A bracket 11 extends out from the fixed pedestal 1 and an adjustable arm 12 extends out from the end of the said bracket, said arm 12 being secured to the bracket by a bolt 13 passing through suitable holes therein and clamping the said parts 11 and 12 together in adjusted position. A belt-pressing device, of special shape, is attached to the outer end of the arm 12 by means of a bolt 14 passing through both of them as hereinafter described. This belt-pressing device comprises two horizontal sections 15 and 16, the outer section 15 being in line with the right-hand belt 10 and the inner section 16 being in line with the left-hand belt 9, and these two parts 15 and 16 are connected together by means of a vertical offset section 17. Each part 15 and 16 is provided with a belt-engaging semicylindrical block 18 and 19, respectively. These blocks 18 and 19 are mounted on opposite sides of the said parts 15 and 16 in such manner as to make their curved surfaces as far apart vertically as possible, that is to say, they increase the offset due to the section 17. The inner end of the part 16 is provided with a lug 20 which extends at right angles therefrom in the same direction as the block 19 and slightly removed from the end of the said part 16, while a second lug 21 extends at right angles in the opposite direction and is positioned at the end of the said part 16. Either one of these lugs 20 and 21 are adapted to lie on the outer side of the arm 12 and to be attached thereto by means of the said bolt 14.

A brief examination of this device shows that the part 16 may lie either above the arm 12 (Figs. 2 and 3) or below it (Figs. 4 and 5). When the sanded surface is on the outside of the belts 9 and 10 then it is necessary that the blocks 18 or 19 engage the upper surface of the belt and the said part 16 is placed above the said arm 12; but when the sanded surface is inward, then the blocks 18 or 19 must engage the lower surface of the belt and the said part 16 is placed below the said arm 12. Also, it will be observed, that the two lugs 20 and 21 are offset from each other laterally or horizontally. In order to permit the adjacent edges of the two belts 9 and 10 to come quite close to the center plane of the pulley 4 and to permit the blocks 18 and 19 to engage across their entire surface, not permitting their inner or adjacent edges to lap over the inner edge of the blocks in contact therewith, I place the blocks 18 and 19 so that their inner edges slightly overlap each other, by substantially the thickness of the offset part 17. For this reason it is necessary to displace the device laterally, so that when the left-hand belt 9 (Figs. 3 and 5) is engaged, the apparatus is pushed towards the left by being fastened to the arm 12 by the right-hand lug 20, or when the right-hand belt 10 is engaged (Figs. 2 and 4) the device is displaced towards the right by being fastened to the arm 12 by the left-hand lug 21. In this way the apparatus is shifted to engage across the entire surface of the stretched belt and yet to be well free from the edge of the other or tight belt. The adjustment of the arm 12 about the bolt 13 controls the extent that the block 18 or 19 pushes the belt 10 or 9, as the case may be, out of the normal path to tighten it.

In order to keep the belts 9 and 10 separate on the pulley I mount, on the same bracket 11, a vertical plate 22 having a long slot 23 therein, through which the same bolt 13 passes. This plate 22 is therefore adjustable vertically on the bracket 11 and is held in vertical position by a shoulder 24 on the said bracket. A diamond-shaped separator 25 is mounted on the end of a horizontal extension of the plate 22. The vertical points of this separator 25 are positioned directly in line with the center of the pulley 4 and engage the inner edges of the two belts 9 and 10 just before they reach

the said pulley. In Figs. 1, 2, 3 and 6 this separator is shown in its lowered position, wherein it engages the under or unsanded surfaces of the said two belts, while in Figs. 4 and 5 it is shown raised in order to engage the upper or unsanded surfaces thereof. Thus it will be seen that the separator 25 prevents either belt 9 or 10 from reaching the central plane of the pulley 4 and therefore keeps them separate, the one from the other. It is also evident that a further adjustment of the plate 22 will raise or lower the said separator 25 to increase or decrease the distance that the said belts travel apart.

Referring now, principally, to Figs. 7 to 10 inclusive:—The pedestal 5 is fixedly secured in position but is provided with a sliding head 26, carrying the idler pulley 6. This head 26 may be adjusted in position in the usual way to control the tightness of the belts 9 and 10, and carries a single V-shaped separator 27 on a plate 28, which extends in both directions, above and below the said separator. This plate may therefore be reversed in position in order to reverse the V-shaped separator 27 in order to make it adapted for use on the belts whether the sanded surfaces are outward or inward thereon.

The third pedestal 7 is shaped so that its lower end is substantially in line with the pedestal 5 while it carries the spindle sander 8 at a point above and well removed from the pulley 6, thus giving room for the workman's feet when using the spindle sander 8, and is Y-shaped at its upper end to span the said idler pulley 6 so that it may be adjusted independent of its position-relative to the said pulley 6. The pedestal 7 rides on a pair of guide tracks 29, one of which may be provided with rack teeth 30 into which a pinion 31, carried by the pedestal 7, meshes. This pinion 31 is turned by the hand wheel 32. The pedestal 7 may be clamped in adjusted position by the clamp screws 33 which are mounted in the said guide tracks 29 and pass through slots in the base of the said pedestal 7. The adjustment of the said pedestal 7 controls the tautness of the belts 9 and 10 in passing over the spindle sander 8 carried thereby.

The upper ends of the tines of the Y-shaped pedestal 7 are cut to form rectangular extensions or lugs 34. These lugs 34 enter slots 35 in a cross bar 36 of the sanding attachment 8. Usually this cross bar 36 extends straight across from one tine to the other (Figs. 1, 9 and 10) but when the spindle sander attachment is arranged for a very sharp curve this bar may be offset (Figs. 7 and 8) to permit the belts 9 and 10 to pass directly thereunder from the drive pulley 4; otherwise I usually pass the belts 9 and 10 around the idler wheel 6 and then around the spindle sander attachment, as seen in dotted lines in Fig. 1. The bar 36 rests on shoulders 37 on the tops of the tines of the pedestal 7, formed by the rectangular lugs 34, and is adjustable at both ends by means of two pairs of set screws 38 engaging the front and rear faces of the said lugs 34. Thus by adjusting the right-hand end of the bar 36 forward and the left-hand end thereof rearward the said bar 36 is twisted slightly out of the normal alignment; or by adjusting them both equally forward or backward the belts may be tightened or loosened as desired.

I prefer to have the spindle sander attachment removably secured to the bar 36, though in the special case of the sharp edge as above described the bar and the attachment may be formed of one piece, or permanently attached together. As shown in Figs. 9 and 10 this attachment comprises a base 39 having slots 40 to engage the fastening bolts 41 by which it is removably secured to the cross-bar 36. This base 39 carries a block 42 of the desired shape. The block 42 has a working surface 43 of the requisite curvature. The block 42 is covered by a layer of felt 44, and this felt is in turn covered by canvas 45 thoroughly impregnated with glue to give it the required wearing qualities. The belts 9 and 10 pass around the curved part 43 with their sanded faces outward and are adapted to smooth an inward curve or groove. The part to be thus smoothed is held by the operator against the curved part 43, first using the rough sand belt and then shifting it laterally to engage the finer sand belt whereby it is finished.

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

1. A double belt sanding machine, comprising a driven pulley; a pair of endless sanding belts riding thereon and driven thereby; means supporting the other ends of the loops of said endless belts; and transversely diverging separator means adjustably supported adjacent the pulley and engaging the belts as they approach the pulley, whereby the extent of the separation of the belts may be controlled.

2. A double belt sanding machine as set forth in claim 1, wherein said endless sanding belts have one side sanded; and wherein said separator means comprises a V-shaped body having the point of the V inserted between the belts, whereby the edges of the belts engage the sides of the V-shaped body with the unsanded sides.

3. A double belt sanding machine as set forth in claim 1, wherein said endless sanding belts may be mounted with their sanded sides inward or outward on said pulley; and wherein said separator means comprises a rhombus-shaped body with its sharp points vertical and which is vertically adjustably

supported whereby, when it is at its lower position its upper angle passes between the belts and its upper sides engage the edges of the lower unsanded sides of the belts and when it is at its upper position its lower angle passes between the belts and its lower sides engage the edges of the upper unsanded sides of the belts.

4. A double belt sanding machine comprising a driven pulley; a pair of endless sanding belts riding thereon and driven thereby; adjustable means supporting the other ends of the loops of said endless belts, whereby their tautness may be controlled; means adapted to keep the two belts separate; a supporting arm having an upper and a lower surface; and a belt-pressing device secured to said arm on either said upper or lower surfaces, and comprising a block which when it is secured to the upper surface of the supporting arm projects downward and is adapted to press downward on the upper side of either one only of the belts, and when it is secured to the lower surface of the supporting arm projects upward and is adapted to press upward on the under side of either one only of the belts, whereby the slacker of said two belts may be pressed upward or downward to bring its tautness to substantial correspondence with that of the other belt.

5. A double belt sanding machine as set forth in claim 4, wherein said belt-pressing device is reversible and comprises two blocks mounted on its opposite sides, said blocks being offset laterally from each other to come into alignment with the two belts respectively, whereby when the device is mounted in one position one block engages one belt to take up its slack while if it is mounted in its reverse position the other block engages the other belt to take up its slack.

6. A double belt sanding machine as set forth in claim 4, wherein said belt-pressing device is reversible and comprises two blocks mounted on its opposite sides, said blocks being offset laterally from each other to come into alignment with the two belts respectively; together with securing lugs extending from the two sides of said belt-pressing device, said lugs being offset laterally from each other, whereby when the left block is positioned to engage the left belt the belt-pressing device is displaced toward the left and when the right block is positioned to engage the right belt the belt-pressing device is displaced toward the right, thereby in each case drawing any portion of the belt-pressing device out of contact with the other belt.

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