Jan. 10, 1933. J. P. QUINN 1,893,679

HAND AND ROTARY SANDER

Filed May 25, 1929 2 Sheets-Sheet 1

Fig. 1

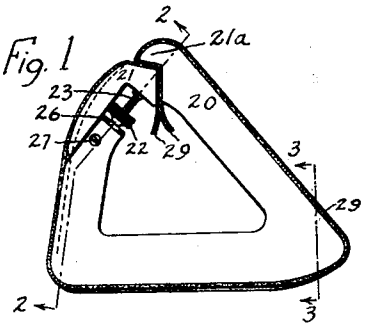


Fig. 2

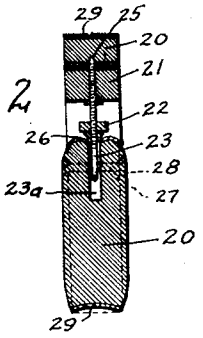


Fig. 5

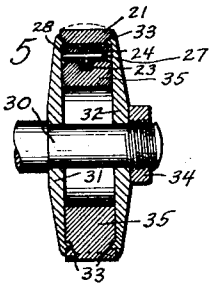
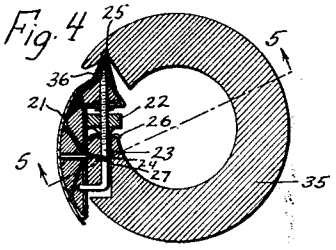


Fig. 4



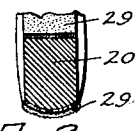


Fig. 3

Fig. 7

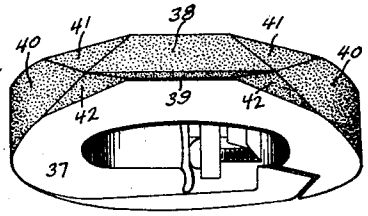


Fig. 8

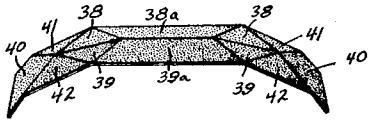


Fig. 9

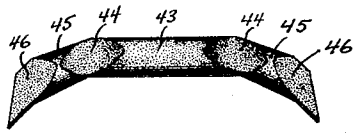
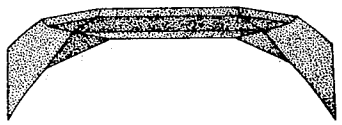
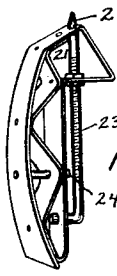


Fig. 10





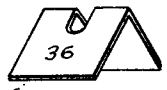


Fig. 6

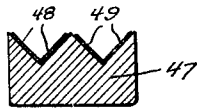


Fig. 11

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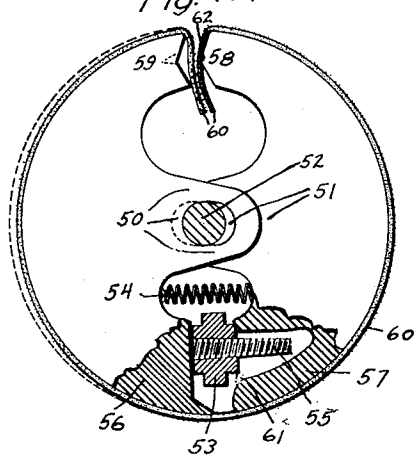
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HAND AND ROTARY SANDER

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Fig. 12



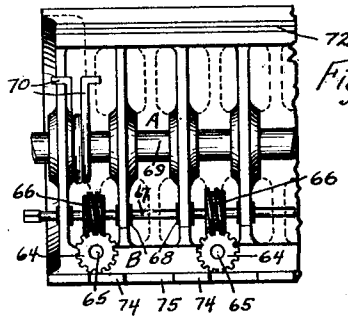


Fig. 14

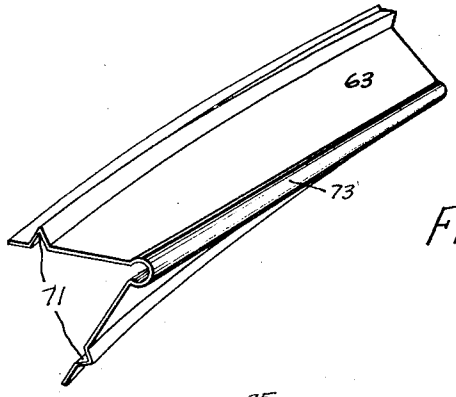
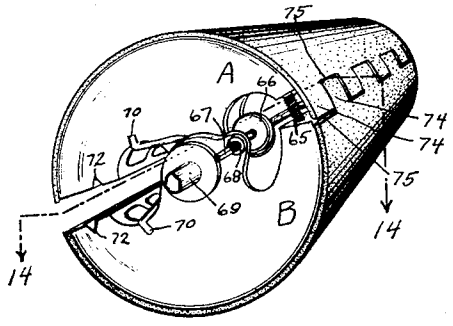
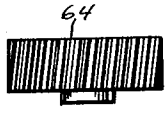


Fig. 13





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UNITED STATES PATENT OFFICE

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HAND AND ROTARY SANDER

Application filed May 25, 1929. Serial No. 365,998.

The present invention appertains to hand and rotary sanders and has for its prime object to provide devices of this nature on which a piece of sandpaper or the like may be placed thereabout, in order that it may be most conveniently utilized.

Another important object of the invention is to provide numerous different means for forms and shapes, on which a piece of sandpaper may be wrapped and brought into a tight and compact manner, which is reliable, inexpensive to manufacture, strong, durable, easy to manipulate, and well adapted to the purpose for which it is designed.

With the above and numerous other objects in view, as will appear as the description progresses, the invention resides in certain novel features of construction and in the combination and arrangement of parts, as will hereinafter be more fully described and claimed.

In the drawings:

Fig. 1 is a side elevation of a preferred hand sander such as would be very useful for bench work, and of such form as to be most conveniently used with both hands.

Fig. 2 is a vertical sectional view of an adjustable sliding jaw as set in the sander taken on the line 2—2 of Fig. 1, as shown thereof.

Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal vertical center sectional view of the sliding jaw as set in a circular form of sander.

Fig. 5 is a cross sectional view taken on the line 5—5 of Fig. 4, and same also mounted on the end of a rotary shaft.

Fig. 6 is a detail perspective view of the sliding jaw, showing here a form of construction.

Fig. 7 is a perspective view of an elliptical shaped sander having a V groove effacing surface thereon such as may be held by one hand for articles held in the other.

Fig. 8 shows a perspective view of the effacing side of a strip of sandpaper given an angle which in turn forms an inverted V ridge.

Fig. 9 shows a perspective view of a similar strip showing a straight ridge curved in cross section.

Fig. 10 shows a perspective view of a similar strip showing a combination arrangement.

Fig. 11 is a cross sectional view showing a portion of a frame with two V grooves side by side.

Fig. 12 is a side elevation of a modified form for either hand or rotary sanders.

Fig. 13 is a perspective view of a similar principle in a cylinder form of considerable length.

Fig. 14 is a cross sectional portion of Fig. 13 taken on line 14—14 thereof, and showing its assemblage.

Referring to the drawings in detail, numeral 20 indicates a triangle-shaped frame with a portion open and fitted so as to receive a sliding jaw 21 thereon, which engages or disengages into a recess formed about a receiving jaw 21*a*; the operation is performed by turning a thumb screw 22. The said jaw 21 combines with an L-shaped pin 23, of which the longest end projects through the front or face thereof, the other end extends towards the rear of which the short end there enters.

Fig. 6 shows a body of the said jaw which is formed mainly of a single strip of material, such as metal; its shape so formed is thought to be evident from the drawings. All points adjoining within itself are riveted or united in a suitable manner.

The pin 23 is threaded at each end and secured therein as may be seen. The forward end is threaded back a considerable distance on which the thumb screw 22 is fitted and turns; the foremost point of said end is sharp and projects through the front, forming a prong 25 which is received in a hole in the said receiving jaw. The body of the jaw 21 may then be filled in with a suitable plaster or the like to make it solid as shown in the other figures.

The thumb screw 22 has a spherical shaped base which sets into a flanged cup-shaped member 26 which forms a socket to hold said base in that position; the said cup-shaped member 26 has an aperture and the adjacent portion of the frame 20 upon which the said member 26 rests, is bifurcated to receive the L-shaped pin 23 (see 23*a* Figure 2), a cross screw 27 passes through the frame 20 at a

point so as to also pass between the L-shaped pin 23 and jaw 21, and engages with a nut 28. It now may be seen that by turning the thumb screw 22 the jaws will open or close as directed.

The outermost surface of the frame 20 is of suitable shape so that a band of abrasive cloth as at 29 may be brought about the said frame, with both ends inturned between the jaws, which ends then may be clamped as seen in Figure 1. Said frame may be regarded as rigid; but in most cases of the hand sanders herein described the generally preferred construction is one that may be expanded to some extent. This is performed in the same manner as in closing the jaws, i. e., by tightening the thumb screw 22, which expands the frame through the pressure exerted on the cup-shaped member 26, and in so doing brings the said band into a tight and compact contact about the frame; the sander is then ready for use.

It may be seen that the frame 20 has three effacing surfaces, the foremost portion of one is ball-shaped which is shown at the curve which crosses the lower part of line 3—3 in Figure 1, same enters into a flat surface in the direction of the arrows thereof, and in turn into a concave surface at the curve which crosses the lower part of line 2—2; cross sections may be seen in Figures 3, and 2 respectively; the object of the concave surface or depression thereof, is to have the total distance of the effacing surface around the frame, at the sides and the center, or at any given point, on a parallel line with the center equally uniform; however, in this case it is necessary that the band 29 should be of such material as would yield to a diagonal tension, ordinarily such as emery cloth. Paper abrasive may be used if the cross surface is straight, as indicated by the broken line in Figure 2, and leaving it lay over the ball at will.

In describing the general use for the above form it will be found especially useful for bench work, the ball as described is for sanding rough places, whereas it may be tilted so as to concentrate the weight on any particular point.

Figure 4 shows a circular form, which will serve for both hand and rotary sanders, and is useful in various sizes. As a hand sander it is most suitable for light work and such as an eraser for ink, the ball and depression as shown in Figure 1 are generally preferred opposite each other, as may be seen by the broken lines shown in Figure 5.

Figure 5 which shows a cross sectional view of this circular form, also shows it mounted on a drive shaft 30 and used as a rotary sander; it is held firm between two disc-shaped members 31 and 32 which act as clamps, which in turn (with the sander between them) are held firmly together by a nut 34 which screws on the shaft 30, the disc 31 is rigidly secured to the shaft, whereas the sander and the disc 32 are dismountable by unscrewing the nut 34; both discs are provided with a number of spurs 33, spaced about their outer edges, which set into holes similarly spaced about the sander, and which hold the sander in true position. It may be referred to that the abrasive strip is first placed about the sander and same expanded to the correct size in preparation to being clamped therein. However so far as it is now described it is necessary to remove the sander each time in order to remove the abrasive band, or vice versa.

Moreover by altering the discs and jaw 21, such adjustment can be made without removing the sander or disc 32. The said discs would then be cut somewhat away in and at the right places to allow access to the thumb screw 22, the said jaw would be a trifle narrower with slots in its sides instead of the spaced holes to receive the spurs 33, (or these spurs about the jaw and including such portions of the discs, may be removed altogether) the necessary purpose being to allow free movement for the said jaw when the sander frame 35 is clamped between the said discs.

It may be pointed out that in a means of this kind the sander does not expand diametrically, and in order to correctly perform the function in which the expanding frame 35 would otherwise perform a V-shaped collapsible spring element is provided as shown at 36, (Figure 4), which is of a resilient nature and holds the inturned ends of the abrasive strip against each jaw, while said jaws are being closed; although this arrangement does not expand outwardly it involves an analogous principle which will be hereinafter more fully described. It will be noted that the jaws are fitted to a certain pitch in shape, for which they fit each other, with the member 36 conforming to the said fit when the jaws are closed, but said member 36 is of more pitch in its released nature, being shown in this position in Figure 4, it rides on the center of one of the jaws and the outside portions of the other when said jaws are being closed, and as in expanding the frame, will take up the slack in the abrasive strip about the form. The said member 36 has an enlarged opening for which to allow the projecting prong 25 to pass.

Figure 7 shows an elliptic shaped frame 37, part of its exterior surface has a V groove, indicated by the surface characters 38 and 39, and is altered to straight cross surfaces 40, through the medium of verged tapering ridges 41 and 42 as shown, and is formed so as to be the correct shape for which a strip of sandpaper or the like will conform with such shape when same is drawn over it, and

is altered from the V groove to a straight cross surface, so that same may be brought within the jaws.

In order to attain the right shape for Figure 7, so that the abrasive band or strip will lay correctly, the best method would be to mold or form the strip first, and to this end a strip of cardboard, sheet metal, or the like may be formed to shape, for use as a mould or pattern; it being understood that no matter what particular shape is formed from a piece of sheet material, providing same is not stretched or drawn, that another sheet will positively conform with it, the shape here, is thought to be plain from the view.

Figure 8 shows a means by which the center portions of the V groove, such as is shown in Figure 7, may be inverted to form a ridge, as shown at 38*a* and 39*a*; wherein the groove as originally seen in Figure 7 is here divided, and the center forming the ridge as shown.

The V grooves, and ridge being so formed it may be seen that on the same principle rounded ridges and grooves may be formed. Figure 9 shows a strip formed in this manner, 43 indicates a rounded ridge, 44 short rounded grooves, 45 verged rounded ridges, and so extended as to join with straight cross surfaces 46.

Figure 10 is a similar form to Figure 7, with the exception of a deeper groove with a shoulder on one side, as shown.

There are many combinations that may be formed either singly or in a series placed side by side in one frame and one jaw of considerable width; the object in this is, so that single strips of sandpaper in different grades may be used on one frame.

Figure 11 shows a cross sectional portion of a frame 47 indicating two V grooves side by side with strips of abrasive material thereon, described as 48 coarse and 49 fine.

Figure 12, 13 and 14, are modified forms made up of two members of about equal size and connected as jaws, which are swung on a center axis or pivot. As for the longer or cylindrical form of sanders, these are better adapted to be placed on a shaft between boxings than the form shown in Figure 5. As for hand sanders these forms are considered superior to Figure 4 as an ink eraser.

Figure 12 represents a circular form of this kind, which is made up of two semicircular members, each of which is provided with inwardly extending portions as at 50 and 51; the member 50 bifurcated to receive the portion 51; all are fitted with holes, such as will receive a pin 52 which links the two members together, as may be seen in the drawings. The said pin may be fitted with heads, or secured in the said hole of portion 51, here shown without heads for better illustration.

The holes through the portion 50 are oblong, or slot shaped; wherefore the two halves are linked together so as to be moved to or from each other to a certain extent, thus decreasing or increasing its dimension. The said movement is adjustable by turning a thumb screw 53, which acts against the tension of a coil spring 54, said tension is inwardly at all times.

The thumb screw 53 fits and turns on a threaded stud 55 (a central section view of same is here shown, and of the adjacent portions as at 56 and 57). The said stud is set in the portion 56 and projects across into an enlarged hole in the opposite portion 57, the said thumb screw is here shown turned to the position for which the form is released to its smallest size, and at which point the jaw portions shown at 58 and 59 are open, and with the tension bearing against the said thumb screw and the innermost bearing position of the center portions 50 and 51.

This form is adjusted in relatively the same way as hereinbefore described for Figs. 1 and 4; an abrasive band as at 60 is brought about the form, the ends inturned between the jaws and the thumb screw turned towards the portion 57, thus spreading these portions and the form, i. e., first it transfers the bearing pressure which is exerted on the center portions to the jaw portions, thus closing the jaws on the said band 60, after that further adjustment will expand the form.

The base of the thumb screw conforms with a seating 61, said seating and the hole which receives the stud 55 are a trifle slot-shaped so as to allow for the swing in movement of the thumb screw 53 and the said stud. On the jaws; one is provided with a prong 62 which is received in a hole in the opposite jaw.

This form of sander will also serve as a rotary sander; in this the pin 52 will be considered as the drive shaft and set firm with the portion 51, and the form in true circumference about the said pin when in its expanded position; or as may be seen by the broken lines in Fig. 12; the broken lines adjacent the said pin represents a portion of the slot-shaped holes in the portions 50 when so expanded. Moreover for other preference, which will hereinafter be referred to; the slot-shaped holes may be reduced to round ones, the size conforming to fit about the said pin; in this the form does not expand diametrically, and as shown and described in Fig. 5, wherein the collapsible spring element as at 36, Fig. 4 is used, would also be used for this form, and the adjustment made in relatively the same way as for Fig. 5.

It may be pointed out that the collapsible spring element is very servable wherein the principle is used in cylinder forms, and is better illustrated in Figures 13 and 14; the general combination having already been described in Fig. 12 it will therefore only be necessary to describe the difference in reference thereof.

The half members shown in Figures 13 and 14, are designated by the characters A and B; the broken lines in Figure 14 represent the member A as viewed in front of B; each of the said members has a number of inwardly extending portions, which are similar to the single portion 51, and which interfit between other bifurcated portions, similar to the portion 50, extending inwardly of the member B, and all the holes in the portions of both members are brought into alignment, through which a drive shaft 69 is received, said shaft is fixed in relation to one of the half members and free with the other. The outer edges of the said members are a trifle apart from each other, thus the two members are so connected as to be free in movement to rock in relation with each other. One of the sides between the adjacent portions thereof forms the jaws; the coil spring 54 referred to is here replaced by a spring 70, which is coiled about certain hubs of the respective half members, (as is evident in both Figures 13 and 14) said spring is hooked to each member in such a way as to force the jaws open. The thumb screw 53 and stud 55 in Figure 12, are here replaced with a number of worm gears 64 and threaded studs 65 respectively; a worm gear is shown disassembled in Figure 13; this form being long, the said gears and studs are placed at intervals between the said half members, said studs are fixed in relation with the half member A and projects across into enlarged holes in the member B, each of said worm gears is fitted out with a threaded hole at its center and fitted upon the said studs 65. All of these gears seat upon the member B and in relatively the same way as the screw 53 seats on the portion 57 in Figure 12.

It may be noted that some of the worm gears are placed inside the cylinder, and these unlike the thumb screw 53, ordinarily cannot be reached by hand; to overcome this difficulty I provide a number of spiral gears 66 which conform and mesh with the gears 64; the gears 66 are placed and fixed at intervals on the shaft 67, said shaft in turn journals in bearings 68 provided in the half member B, one end of the said shaft is square and projects outside the cylinder, upon which a hand wheel, key, or other means may be used to turn same; said gears and shaft, 66 and 67 respectively are placed at such positions that the gears 66 will mesh, one with each one of the gears 64. It now may be seen that the shaft 67 will turn all the worm gears 64 through the spiral gears 66, and that the above combination will perform the same function that is performed by the thumb screw 53 in Figure 12; it being understood that the spring 70 will open the jaws at any time the gears 64 release same.

The collapsible spring element for the cylindrical form of tool is shown in Figure 13 disassembled, as at 63, which is made up in a single piece of resilient sheet material doubled over V-shaped in end elevation having tapering ridges 71 thereon, said element fits between the jaws of the cylinder with the said ridges fitting into grooves 72 provided therein. It first serves as a means for thrusting and locking the ends of the sandpaper in place in the open jaws; each end of the sanding sheet is held between one of the combined portions 71 and 72, thus both ends are clamped in the open jaws and apart from each other whereby the closing of the jaws will take up the slack in the sandpaper about the form.

The advantage of this form over that shown in Figure 12 for rotary sanders is that the circumference is always a true circle whether the jaws are closed or not, and since the spring element 63 holds the sanding sheet at any position therein, said sander may be used without fully closing the jaws; whereupon any stretching, or loosening, of the said sheet that take place when being so used, may be taken up, on further closing the jaws.

It may be pointed out that, although the form shown in Figure 13, does not expand diametrically as does the others; but has the expanding principle, which is operated by the same means that grips the ends of the sanding sheet; although the spring element 63, in itself, grips the said ends; it, in general, only furnishes a very small amount of pressure when the jaws are fully open; wherefore, in order to apply the necessary pressure, depends on the approaching movement of the jaws. When the said sheet is held in the open jaws, as described, the sheet supporting surface is then somewhat less than the 360 degrees of the cylinder; whereupon, on closing the jaws, brings the said supporting surface up to substantially 360 degrees; thus gripping both ends of the sanding sheet and at the same time enlarging the supporting surface, and taking up the slack in the sanding sheet, as above referred to.

The run of the jaws across the face of the cylinder are usually preferred a trifle out of parallel with the axis; however, in such cases the opening is a trifle spiral-shaped, and whereas owing to the action of the collapsible spring element placed therein, same should be straight at the turn 73, and of such width as to bring the said turn into range as close to the axis, as means will permit, and preferable in two or more pieces in cylinders of considerable length.

On the opposite and adjusting side of the cylinder, and along the adjacent edges of each half member, each is fitted with spaced tooth-shaped members 74 which are formed integral therewith, with each respective half, and are such that each interfits with each opposite half (as shown at 75), so as to allow the necessary movement between the said half members; wherefore this arrangement provides a longitudinal surface bearing on the face of

the cylinder opposite the jaws when jaws are closed.

Nearly all sanders, especially rotary, are covered more or less with a suitable felt, although in this case, such may conform with the said members 74, but in the preferred form such should be of a pliable of elastic nature and secured to the jaw side only, having the ends meet at the edges of the jaws.

The principle of the invention herein involved, is capable (using such forms as shown in Figures 5, 12 and 13), of serving as a holder for either flexible printing plates or impression blankets in a printing press; the flexible printing plate or blanket as the case may be would be held in substantially the same way as has been hereinbefore described for holding sandpaper for sanding purposes; this however is more suitable for presses used for printing hand bills, designs on lumber, or for toys and equivalents.

I am aware that changes in form, construction and arrangement of parts may be made without departing from the spirit and without sacrificing the advantages of the invention, and I reserve the right to make all such changes as fairly fall within the scope of the following claims,

I claim:

1. In a sander, a pair of members each forming part of a peripheral surface to support a sanding sheet, said members being connected in such a manner as to be movable relative to each other, and being provided with opposed jaw portions adapted to engage between them the inturned ends of a sanding sheet, and means connecting said members to move them so as to securely retain the said inturned ends between the said jaws, and at the same time while being so held, enlarge the said peripheral surface, to take up the slack in the sanding sheet.

2. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected in such a manner as to be movable relative to each other, and being provided with opposed jaw portions adapted to engage between them the inturned ends of a sanding sheet, and means connecting said members to move them so as to securely retain the said inturned ends between the said jaws, and at the same time while being so held, enlarge the said peripheral surface, to take up the slack in the sanding sheet, said means comprising a finger rotated element having a threaded engagement with one of the members and a rotatable seating engagement with the other.

3. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected in such a manner as to be movable relative to each other, and being provided with opposed jaw portions adapted to engage between them the inturned ends of a sanding sheet, and means connecting said members to move them so as to securely retain the said inturned ends between the said jaws, and at the same time while being so held, enlarge the said peripheral surface, to take up the slack in the sanding sheet, one of the jaw portions being concave and the other being convex to fit.

4. In a sander, a pair of members each forming part of a peripheral surface to support a sanding sheet, said members being connected in such a manner as to be movable relative to each other, and being provided with opposed jaw portions adapted to engage between them the inturned ends of a sanding sheet, and means connecting said members to move them so as to bring the jaw portions into mutual engagement, and a collapsible spring element to fit between the jaws and to resiliently secure the sanding sheet against the jaws during approaching movement of the jaws relative to each other.

5. In a sander, a pair of members together forming a complete ring having a peripheral surface to support a sanding sheet, said members being connected in such a manner as to be movable relative to each other, and being provided with opposed jaw portions adapted to engage between them the inturned ends of a sanding sheet, and means connecting said members to move them so as to securely retain the said inturned ends between the said jaws, and at the same time while being so held, enlarge the said peripheral surface, to take up the slack in the sanding sheet.

6. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their peripheral surface for combined rocking and expanding movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart.

7. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their peripheral surface for combined rocking and expanding movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart, said means comprising a finger rotated element having a threaded engagement with one of the members and a rotatable seating engagement with the other.

8. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their pe-

ripheral surface by a combined slotted and pivotal connection for combined rocking and expanding movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart.

9. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their peripheral surface for combined rocking and expanding movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart, and resilient means acting between the members to urge the jaws apart.

10. In a sander, a pair of members together forming substantially a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their peripheral surface for rocking movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart, and a collapsible spring element to fit between the jaws and to resiliently secure the ends of the sanding sheet, inturned against the jaws, during approaching movement of the jaws relative to each other.

11. In a sander, a pair of members together forming substantially a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their peripheral surface for rocking movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart, and resilient means acting between the members to urge the jaws apart, and a collapsible spring element to fit between the jaws and to resiliently secure the ends of the sanding sheet, inturned against the jaws, during approaching movement of the jaws relative to each other.

12. In a sander, a pair of members together forming a complete peripheral surface to support a sanding sheet, said members being connected substantially centrally of their peripheral surface for rocking movement relative to each other, coacting jaws formed on adjacent portions of said members, and means acting between adjacent portions of said members, opposite said jaws, to move the members apart, said means comprising a rotatable element having a threaded engagement with one of the members and a rotatable seating engagement with the other, and a collapsible spring element to fit between the jaws and to resiliently secure the ends of the sanding sheet, inturned against the jaws, during approaching movement of the jaws relative to each other.

Signed this 22nd day of May, 1929, in the county of Woodbury and State of Iowa.

JOHN P. QUINN.