May 20, 1952 A. JENSEN 2,597,102

SANDING HEAD

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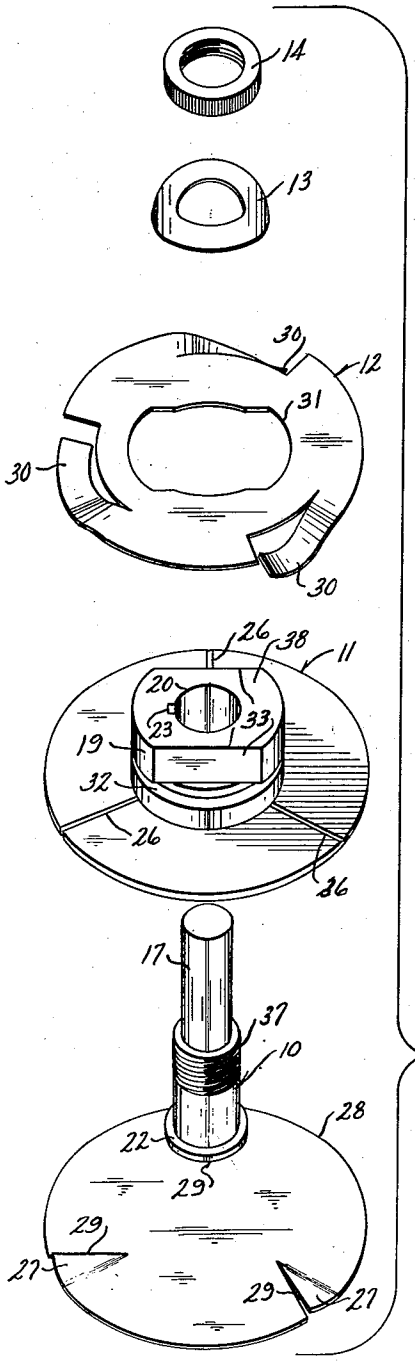


Fig. 1

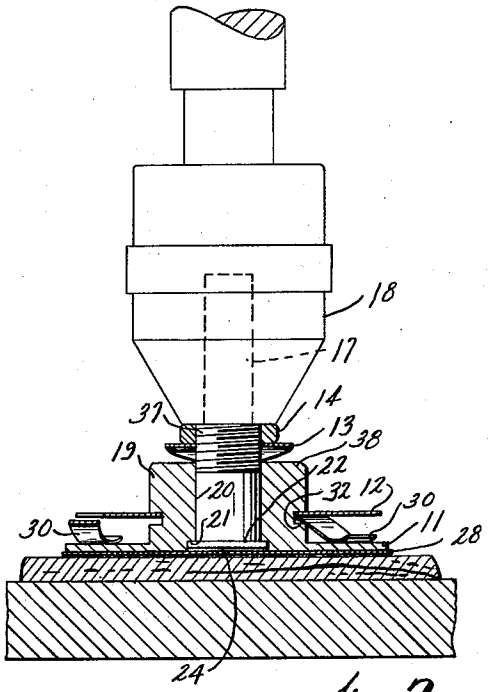


Fig. 2

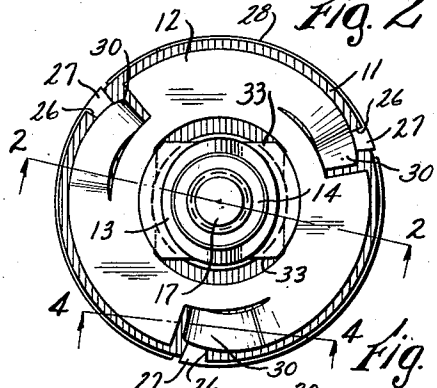


Fig. 3

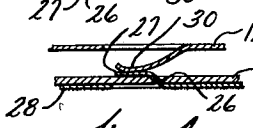


Fig. 4

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SANDING HEAD

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11 Claims. (Cl. 51—197)

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This invention relates generally to improvements in sanding heads, and more particularly to improvements in means for mounting an abrasive disc for use in a movable sander head in a power machine.

It is an object of this invention to provide a sanding head which may be employed with any power machine having a movable power head. It is a particular object of the invention to provide a sanding head to which an abrasive disc, such as sand paper or the like, may be conveniently attached or detached without removing the head from the machine or otherwise disturbing the alignment of the head and machine elements. It is a further object of the invention to provide such a head wherein the abrasive disc is so securely held that it will not become dislodged by normal or even excessive usage and may be completely utilized until worn out.

It is another object of the invention to provide in such a sanding head resilient means whereby chatter or the like will be eliminated as the sander passes over uneven spots in the work.

These objects are accomplished through a novel arrangement of mounting elements which comprise the head and which will be hereinafter more fully described.

Other objects will be more apparent upon examination of the following disclosure.

In the drawings:

Figure 1 is an exploded view in perspective of the physical elements of the sanding head in the order of their assembly.

Figure 2 is a side view, partially in cross section, of the assembled elements taken along the line 2—2 of Figure 3.

Figure 3 is a plan view of the invention with all elements assembled.

Figure 4 is a section on line 4—4 of Figure 3.

With reference to Figure 1, the elements of the sanding head consist generally of a spindle 10, a mounting disc 11, a clamping plate 12, a spring washer 13, and a nut 14. All of the aforesaid elements are operatively mounted on the spindle 10 which is provided with a shank 17 of reduced diameter for engagement in the jaws of a conventional chuck of a rotary machine. Such a chuck is shown in outline form at 18 in Figure 2. The mounting disk 11 is provided with a central hub 19, which hub is axially bored at 20 and counterbored at 21 (see Fig. 2). The spindle 10 is axially slidable through bore 20 and the disc 11 is supported by the spindle shoulder 22. The length of shoulder 22 is made somewhat less than that of the counter bore 21 to provide a clearance,

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shown at 24, between the bottom of the spindle and under surface of the mounting plate. The bore 20 is provided with a key slide 23 which is engaged with a key (not shown) on the spindle whereby rotary motion of said spindle is positively imparted to the mounting plate 11 through the hub 19.

The mounting disc 11 presents a flat face toward the surface to be worked and the abrasive paper to be applied to the flat face must have means for securing it thereagainst and for rotating it therewith. Radial slots 26 extend inwardly from the periphery of the disc 11 as far as the hub. These slots are not axial, but are oblique to the axis for use in a manner now to be described.

A disc of sandpaper 28 approximately the diameter of the mounting disc 11 is provided with inwardly extending kerfs 29 spaced circumferentially to correspond to the radial slots 26 in the mounting disc, but the kerfs 29 are not radial. They are at an angle to the radius in a direction trailing with reference to the direction of rotation of the power head and mounting disc. Thus there are forwardly projecting tongues 27 receivable through slots 26 and the oblique angle of slots 26 is such that the tongues 27 extend upwardly and forwardly to the extent possible in view of their shape. In any event the angle of kerf 29 deviates from the radial slot 26 sufficiently so that tongue 27 overlies the top of the plate somewhat. After the tongues 27 of the abrading disc are inserted through the radial slots 26 of the mounting disc, the portions thereof which lie in exposed relation upon the top of the mounting disc are held by clamp plate 12, as will be now described.

Clamp plate 12 is shaped as shown most clearly in Figure 1 and is made of spring steel. Arcuate spring fingers 30 are struck out of the plate. They are spaced from one another and each is shaped to provide a finger to bear upon one of the tongues 27. Centrally of plate 12 I provide an aperture, the margins 31 of which are irregular in contour to receive the upper portion of the hub 19. The sides of the hub are flattened above a peripheral groove 32. The flattened sides 33 of the hub conform sufficiently to the margins 31 of the aperture in clamp plate 12 so that the plate may axially slide to a position such that the fingers 30 bear upon the top of mounting disc 11. When pressure is applied upon the clamp plate 12 to flex the fingers 30, the clamp plate is depressed sufficiently to align the plate with groove 32 and the clamp plate may then be rotated a fraction

of a turn relative to the mounting disc and relative to the hub 19 so that the plate is held in the groove in the position shown in Figure 3 with each of the fingers 30 bearing upon a tongue 27 of the abrasive material. (See Figure 4.) It will be noted that the fingers 30 are so shaped that they hold the tongues 27 in a somewhat snubbed relation to the margins of the oblique slots 26, thus securely holding the tongues in position.

To release the tongues 27, clamp plate 12 may be rotated just sufficiently so that the spring fingers 30 clear the tongues. It is not necessary to move the plate to a position of release from groove 32. A slight angular rotation will release the tongues 27, and allow the abrasive disc to be rotated to withdraw the tongues from slots 26. A converse operation is used to substitute a new disc. Hence changes in grade of abrasive, as well as replacement of worn discs can be made with facility.

This entire operation may be performed without disturbing the adjustment and alignment of the spindle within the chuck.

It has been found that the spring pressure of the fingers 30 against the tongues 27 more than adequately binds the abrasive disc 28 against the mounting disc 11 so that normal or even excessive usage will not dislodge the abrasive disc. When desired, this permits complete exhaustion of the abrasive qualities of the disc before replacement is necessary.

Mention has already been made of the fact that the oblique angle of slots 26 is such that the tongues 27 of abrasive material extend upwardly and forwardly. The result is that no raw edge of cut abrasive is directed forwardly against the surface to be worked. The exposed raw edge of the kerf 29 upon the face of the mounting disc is a trailing edge and the other of each of these kerf edges is protected at the upper face of the mounting plate.

The sanding head is also provided with resilient means whereby the head is yieldably mounted on the spindle 10. The result is important to the invention because to so yieldably mount the sanding head prevents chatter of the head as the abrading disc passes over uneven parts of the work undergoing the sanding operation.

Spindle 10 is provided with threads 37 at a portion of its peripheral surface adjacent to the shank 17. As best shown in Figure 2 a spring washer 13 encircles the spindle and has one side in pressured contact with the upper face 38 of the hub 19 of the mounting disc 11. Nut 14 is in pressured contact with the opposite side of the washer and may be selectively advanced or retracted on threads 37 to vary said pressure. Thus it is seen that the mounting disc is yieldably biased between nut 14 and towards the shoulder 22 of the spindle 10 which supports the mounting disc in counter bore 21. Upward pressure on the disc will cause the washer 13 to spring slightly and allow for a corresponding axial displacement of the disc on the spindle and thus prevent chatter of the sanding head and power machine as the sanding head passes over uneven portions of the work. Clearance 24 allows for such axial displacement of the mounting disc without interference of the spindle with the smooth exterior of the abrasive disc. The nut 14 may be advanced or retracted on the threads 37 in order to selectively adjust the bias to the most advantageous position.

From the foregoing description taken in connection with the attached drawings it may be seen that by virtue of the novel arrangement of the various elements described, prepared discs of abrasive material may be readily mounted on a sanding head in a positive manner without danger of unintentional dislodgement thereof until worn out, after which time they may be conveniently removed and replaced. In addition, the entire sanding head is constructed in such a manner as to prevent chatter of the head and machine by virtue of the resiliency involved in the spring washer 13. The utility of the sander is enhanced by the spindle arrangement whereby the entire sanding head is detachably mountable in the jaws of any rotary machine having a chuck.

I claim:

1. In an abrading device the combination with a mounting having a slotted plate for surface contact with a tongued abrasive sheet, of a clamp having a spring finger portion normally tensioned in pressure engagement with said plate to hold a tongue of the abrasive sheet at the side of the plate opposite the sheet to releasably hold said sheet to said plate, said clamp having a connection with said mounting on which it is movable to retract said finger from pressure engagement with said tongue, and a spindle for rotatably mounting said mounting in a power machine.

2. The device of claim 1 in further combination with resilient means acting between said spindle and said mounting whereby said mounting is secured on the spindle yieldably in a direction transverse to its plane of rotation.

3. The device of claim 1 wherein the mounting plate is provided with arcuately spaced oblique slits disposed radially in said plate to receive tongues of the abrasive sheet.

4. In an abrading device the combination with a mounting having a slotted plate for surface contact with a tongued abrasive sheet, of a clamp detachably connected to the mounting having portions resiliently coacting with said plate to hold a tongue of the abrasive sheet at the side of the plate opposite the sheet to releasably hold said sheet to said plate, and a spindle for rotatably mounting said mounting in a power machine, the plate being further provided with a central hub projecting from said plate, said hub having a central spindle receiving bore and a peripheral groove, said clamp comprising a spring plate having a hub receiving aperture and arcuately spaced depending fingers, the clamp plate portions adjacent the aperture being receivable in said hub groove, and the fingers comprising the clamp portions coacting with the mounting plate to hold the tongues of the abrasive sheet.

5. In a device of the character described an abrasive disc mounting comprising a mounting disc having arcuately spaced oblique slits disposed radially in said mounting disc, a central hub projecting from said disc having a spindle receiving bore and a peripheral groove, the portions of said hub disposed above said groove having guide sides, and a clamp plate having a central aperture of irregular contour to provide guide sides for approximate registration of said clamp plate in detachable relative rotative engagement with said peripheral groove in said hub and having arcuately spaced depending spring fingers for pressure engagement with said mounting disc at selected positions with respect to said oblique slits when said clamp plate is

engaged with the peripheral groove of said mounting disc.

6. In a device of the character described an abrasive disc mounting means comprising in combination a mounting disc having a plurality of arcuately spaced oblique slits disposed radially in said disc, a central hub projecting from said disc and having a spindle receiving bore and a peripheral groove uniformly spaced from the disc, said radially oblique slits extending inwardly from the periphery of the disc to a common diameter, the portions of said hub disposed above said groove having oppositely disposed flattened sides, a clamp plate having a central aperture with edges, portions of which edges are diametered for fitted engagement with the hub, other portions of which edges are diametered for fitted engagement with the internal periphery of the groove, and other portions of which edges are flattened for sliding engagement with the flattened side portion of the hub, and arcuately spaced depending spring fingers for pressured engagement with said mounting disc at selected positions with respect to said oblique slits when said clamp plate is engaged with the peripheral groove of said hub.

7. In a device of the character described the combination with an abrasive disc mounting comprising a plate and a hub projecting at one side of the plate, said hub having an axial bore and a counter bore opening into the plate, of a spindle engaged with said mounting and having a terminal shoulder seated in said hub counter bore, a shank at the opposite end of said spindle from said shoulder, said spindle having an external thread intermediate its ends and adjacent said shank, said mounting disc being supported on said terminal shoulder to dispose the hub in proximity with the spindle thread, a resilient washer apertured to fit about said spindle with one of its sides in pressured contact with the hub, and a nut in threaded engagement with said spindle and in pressured contact with the other side of said washer whereby said mounting means is axially yieldable between said terminal shoulder and said nut with respect to said spindle.

8. The device of claim 7 wherein the axial dimension of the terminal shoulder is less than the axial dimension of the counter bore.

9. In a device of the character described a new

article of manufacture comprising a flexible abrasive sheet in disc form having spaced slits extending inwardly from the periphery of said disc to a common diameter spaced substantially from the center of said disc and at an angle with said periphery.

10. In a device of the character described, a sheet of abrasive material having a marginal, inwardly extending kerf; a mounting plate for said sheet of material having a marginal slot extending inwardly at an angle different from said kerf whereby a tongue of abrasive material is receivable through said slot; and a clamping plate secured to said mounting plate in position to bear upon said tongue extending through said slot.

11. In a device of the character described, a slotted mounting plate having a peripherally grooved hub body, said hub body being irregularly contoured; a clamping plate contoured to conform to the hub in one position of relative adjustment with respect to the mounting plate and having a resilient biasing means to contact said mounting plate, said clamping plate being receivable in said groove for relative rotation with respect to the mounting plate when the clamping plate has been thrust into said groove against said bias; and an abrasive disc for application to said mounting plate and provided with a tongue receivable through a slot in said mounting plate in position to be held by said biasing means when the clamp plate is in engagement with the hub in said groove.

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