Aug. 23, 1966 L. FROSTAD 3,267,622

ABRASIVE PAD STRUCTURE FOR PORTABLE SANDING MACHINE

Filed June 19, 1964 2 Sheets-Sheet 1

FIG. 1

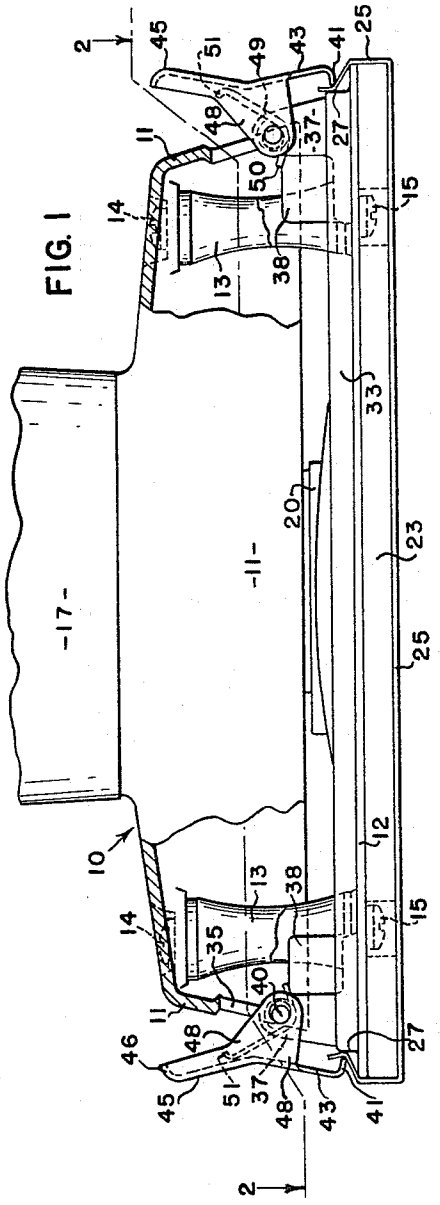
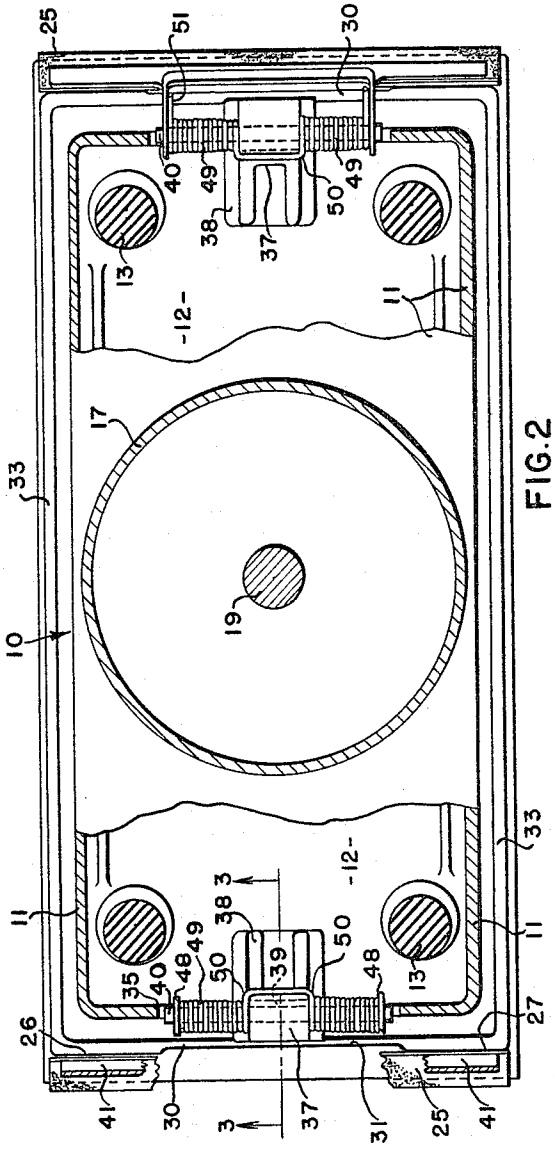


FIG. 2



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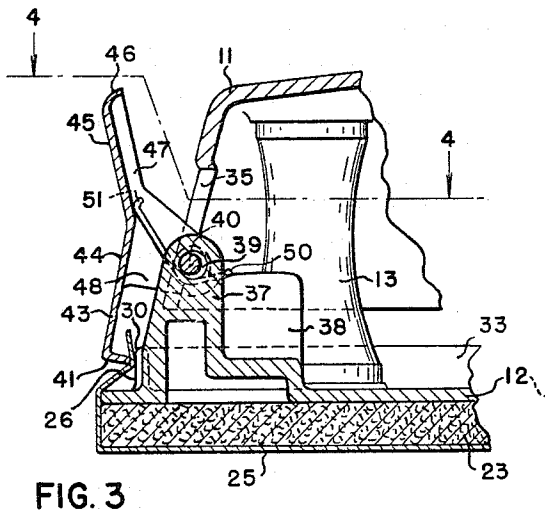
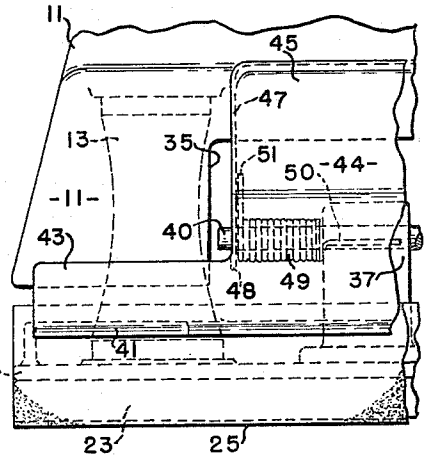



FIG. 3

FIG. 5



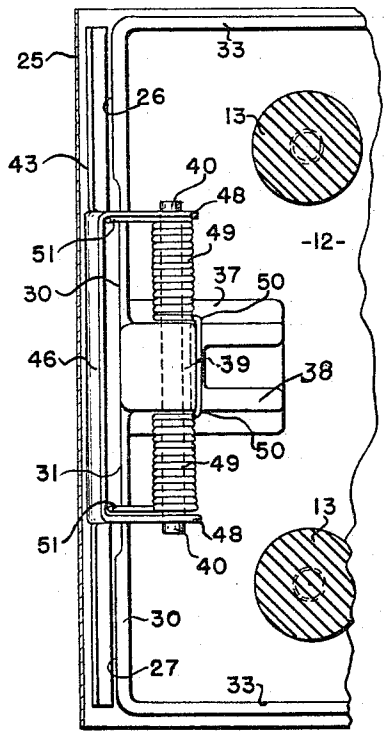




FIG. 4

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# ABRASIVE PAD STRUCTURE FOR PORTABLE SANDING MACHINE

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6 Claims. (Cl. 51—384)

This invention relates to an abrasive sheet carrying pad structure for portable power-operated sanding machines.

The pads for such machines consist of a flat base plate, usually provided with a resilient covering, such as felt, affixed to its under side, and sheet clamping structures at each end of the base plate for clamping the ends of an abrasive sheet overlying the felt covering to the end portions of the base plate.

The base plate of the pad is mounted on the frame of the machine for movement relative thereto in a horizontal direction. Motion transmitting means is provided for operatively connecting the base plate to a motor mounted on the frame to effect such movement of the pad. This movement may be reciprocating, or it may be orbital.

Sanding machines of this type are bodily manipulated by hand and are employed to effect the final finish on flat surfaces, such as table tops. Heretofore machines of this type have operated in the order of 3000 to 4000 cycles per second. It has been discovered that if the speed of the machine is increased to 10,000 cycles per minute, the sanding operation not only consumes less time, but a better finish on the workpiece is obtained. Such machines, because of their structural arrangement, tend to produce vibration and as the speed is increased, the vibration becomes more pronounced. This vibration adversely affects clamp structures heretofore employed for detachable clamping the ends of the abrasive sheet to the ends of the pad base plate, causing the clamps to release the abrasive sheet and causing excessive wear at the connections between the clamp and the base plate. Also, prior clamping structures embodied a plurality of parts, expensive to manufacture and attach to the pad structure and, in some instances, required the use of a tool to actuate the clamping mechanism.

This invention has as an object a sanding machine pad embodying a novel abrasive sheet clamping structure comprising one movable member of light weight and which is convenient to operate without the use of tools, and is ecnomical to manufacture and assemble.

The invention has as a further object an abrasive pad structure for portable sanding machines embodying an abrasive sheet engaging and clamping jaw which is self-aligning for effecting a tight clamping action on the abrasive sheet regardless of variations in thickness of the sheet in a direction transversely thereof.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings:

FIGURE 1 is a side elevational view of the lower portion of a sanding machine equipped with an abrasive sheet carrying pad embodying my invention, and with a portion of the skirt of the machine frame broken away at each end of the frame, and with parts thereof in section.

FIGURE 2 is a view taken on line 2—2, FIGURE 1, with parts broken away at the left end of the view.

FIGURE 3 is an enlarged sectional view taken on line 3—3, FIGURE 2.

FIGURE 4 is a view taken on line 4—4, FIGURE 3.



FIGURE 5 is a partial end elevational view looking to the right, FIGURE 3.

Referring to FIGURE 1, **10** designates the frame of the machine which is substantially rectangular in general form and provided with a depending skirt flange **11**. The pad includes a flat metallic base plate **12** also of complemental rectangular form. The plate **12** is attached to the frame **10** of the machine in a manner to permit limited movement of the pad relative to the frame **10** in a plane parallel thereto. The machine shown is of the type wherein orbital movement is imparted to the pad. The pad is attached to the frame by a plurality of flexible posts **13**, the upper ends of which are secured to the machine frame by screws **14**, and the lower ends are secured to the base plate, as by screws **15**. A motor is contained within a cylindrical housing **17** extending upwardly from the machine frame, and the motor shaft, indicated at **19**, FIGURE 2, is operatively connected to the base plate **12** of the pad assembly by suitable motion transmitting mechanism indicated at **20**, FIGURE 1.

This general arrangement of the sanding machine is of conventional form. An example of such a machine being disclosed in Patent No. 2,764,852, to Arthur N. Emmons, December 2, 1956. A yieldable covering **23**, such as felt, is bonded to the under side of the base plate **12**. An abrasive sheet **25** overlies the felt covering **23**, and the ends of the sheet are detachably clamped to the ends of the base plate **12**.

This invention has to do particularly with the structure for clamping the ends of the abrasive sheet to the base plate. The base plate **12** is formed at each end with a pair of shoulders **26, 27**, there being one of these shoulders contiguous to each side edge of the plate. The shoulders are spaced inwardly from the end edges of the plate **12** and are spaced apart laterally of the base plate and extend in a common plane.

As shown in FIGURES 3 and 4, the shoulders **26, 27**, are formed by an upstanding rib **30** extending across the end of the base plate and being recessed, or relieved, as at **31**, in the central portion. The end ribs **30** merge with side ribs **33** that extend along each side of the base plate and serve as reinforcing ribs to prevent distortion of the plate. The skirt **11** of the frame is cut away at each end of the machine to provide an opening **35** to accommodate the abrasive sheet clamping structure mounted on each end of the plate **12**.

The base plate **12** is formed at each end, medial of the side edges thereof, with an upstanding lug **37**. The lug **37** is formed with a transversely extending aperture **39** to receive a pivot pin **40** which extends laterally from each side of the lug and on which is mounted an abrasive sheet clamp. The base plate **12**, including the lug **37**, is economically produced by being die cast from a light metal, such as aluminum.

The clamp is economically pressed formed from a one-piece blank of light gauge sheet metal. The formed clamp has, at its lower end, an inwardly extending flange **41** forming a sheet engaging jaw portion which, in the assembled pad structure, is positioned forwardly of and in confronting relation to the shoulders **26, 27**. The jaw **41** merges with an upwardly extending portion **43**, the central part of which extends upwardly, as at **44**, and merges with an upper portion **45** that is inclined outwardly to provide a handle portion for conveniently operating the clamp about the pivot pin **40**. The medial portions **44, 45**, of the clamp are bent inwardly at their top and side edges to provide reinforcing flanges **46, 47**. The lower portion of the side flanges **47** extend inwardly a substantial distance to form ear portions **48**. These ear portions **48** are formed with aligned apertures to receive the end portions of the pivot pins **40**.

A torsion spring 49 is positioned on the pivot pin 40 intermediate each of the ears 48 and the confronting side of the lug 37. Like legs of the pair of springs 49 extend rearwardly from the pivot pin 40 and have their ends 50 positioned on a fixed support.

In the arrangement shown, the lug 37 is formed with rearwardly extending flanges 38. The upper edges of these flanges being contiguous to a horizontal plane passing through the axis of the aperture 39 in the lug 37. The opposite legs of the springs extend upwardly and forwardly from the pivot pin 40, and their ends 51 engage the clamp members in an area located above the horizontal plane passing through the aperture 39. As shown in FIGURE 3, the ends 51 of these spring legs engage the inner surface of the clamp member in proximity to the joinder of the portions 44, 45. The springs 49 urge the clamp member about the pivot pin 40 to move the clamping jaw portion 41 against the end of the abrasive sheet 25 to compress the same against the shoulders 26, 27 of the base plate.

Referring to FIGURE 3, the aperture 39 is somewhat greater in diameter than the diameter of the pivot pin 40. This permits the pivot pin 40, and accordingly the jaw 41, to have limited angular movement relative to the plane in which the shoulders 26, 27, are located. This permissive movement of the pivot pin 40 permits the jaw 41 of the clamp to assume a position out of parallelism with the shoulders 26, 27, to firmly clamp the ends of the abrasive sheet 25 against the shoulders 26, 27, regardless of any variation in the thickness of the abrasive sheet in a direction transversely thereof.

The arrangement of the engagement of the ends 50, 51, of the legs of the springs 49 with the clamp member and the support 38, as above described, serves to prevent any relative movement between the clamp member and the base plate during the high speed operation of the machine. It will be observed, referring to FIGURE 3, that the height of the top edges of the support flanges 38 are such that the rearwardly extending legs of the springs urge the pivot pin 40 upwardly and forwardly in the aperture 39, which would not be the case if the ends 50 had engagement at the substantially low point. In the arrangement employed, the angle formed by the rearwardly extending legs of the spring and the forwardly extending legs does not exceed 120°.

I have found that if this angle is increased, the pin 40 and the clamp member will, during high speed operation of the machine, reciprocate forwardly and rearwardly, rapidly enlarging the aperture 39, with the result that the pivot pin 40 will eventually cut its way through the lug 37.

Preferably the springs 49 are wound from a single wire, the legs 50 being connected together as shown in FIGURES 2 and 4. This spring formation aids in the assembly of the clamp structure. The intermediate portion connecting the legs 50 is positioned on the flange 38 in close proximity to the pivot pin 40. This increases the upward pressure on the pin 40 in the clamp member to prevent any play between the pin, clamp member, and lug 37.

The abrasive sheet 25 is applied to the machine by pressing the upper portion 45 on one of the clamp members inwardly, which effects outward movement of the clamp jaw 41 from the shoulders 26, 27. One end of the abrasive sheet is then inserted between the shoulders and the clamp jaw 41, and the clamp released. The torsion springs 49 yieldingly urge the jaw 41 inwardly to clamp the end of the abrasive sheet against the shoulders 26, 27. The abrasive sheet is then pulled over the felt cover 23 and the opposite end of the abrasive sheet 25 is clamped to the opposite end of the pad by operating in like manner the clamp at the opposite end of the pad.

What I claim is:

1. An abrasive sheet carrying pad for portable power-operated sanding machines including a flat base plate formed at each end with a pair of upstanding shoulders, the shoulders of each pair being contiguous to the side edges of said plate, said shoulders being spaced apart transversely of the plate in a common plane and being spaced inwardly from the end edge thereof, said plate being formed with an upstanding lug contiguous to each pair of shoulders, a pivot pin carried by said lug, and an abrasive sheet clamp member mounted on said pivot pin and having an abrasive sheet engaging jaw portion extending transversely of the base plate outwardly of said shoulders, said jaw portion having a length comparable to the width of the base plate, a pair of torsion springs mounted on said pivot pin, said springs engaging said clamp to yieldingly move said jaw portion of the clamping member toward said shoulders for clamping the ends of an abrasive sheet thereagainst, said pivot pin having limited angular movement in said lug relative to the plane of said shoulders.



2. An abrasive sheet carrying pad for portable power-operated sanding machines including a flat base plate formed at each end with a pair of upstanding shoulders, the shoulders of each pair being contiguous to the side edges of said plate, said shoulders being spaced apart transversely of the plate in a common plane and being spaced inwardly from the end edge thereof, said plate being formed at each end with an upstanding lug medial between the side edges of said base plate, a pivot pin carried by said lug and extending laterally from each side thereof, an abrasive sheet clamp having a sheet engaging jaw portion extending transversely of the base plate outwardly of said shoulders and having a length comparable to the width of the base plate, said clamp having a portion extending upwardly from said jaw and formed at its sides with rearwardly extending ear portions spaced laterally from the sides of said lug, said ear portions being apertured to receive said pivot pin, a torsion spring positioned on said pivot pin intermediate each of said ears and said lug, said springs engaging said upwardly extending portion of said clamp and being operable to yieldingly move said clamp about the axis of said pivot pin to move said jaw portion toward said shoulders for clamping the ends of an abrasive sheet thereagainst, said pivot pin being mounted in said lug for limited annular movement in respect to the plane of said shoulders.

3. An abrasive sheet carrying pad for portable power-operated sanding machines including a flat base plate formed at each end with a pair of upstanding shoulders, the shoulders of each pair being contiguous to the side edges of said plate, said shoulders being spaced apart transversely of the plate in a common plane and being spaced inwardly from the end edge of the plate, said plate being formed contiguous to each pair of shoulders with an upstanding lug, a pivot pin carried by said lug and an abrasive sheet clamp member mounted on said pivot pin and having an abrasive sheet engaging jaw portion extending transversely of the base plate outwardly of said shoulders, said jaw portion having a length comparable to the width of said base plate, a pair of torsion springs mounted on said pivot pin at opposite sides of said lug, each of said springs having one leg thereof extending forwardly and upwardly from said pivot pin and engaging said clamp member in an area above the horizontal plane passing through said pivot pin, the opposite leg of each of said pair of springs extending rearwardly from said pivot pin and engaging a support located contiguous to said horizontal plane.

4. An abrasive sheet carrying pad for portable power-operated sanding machines including a flat base plate formed at each end with a pair of upstanding shoulders, the shoulders of each pair being contiguous to the side edges of said plate, said shoulders being spaced apart transversely of the plate in a common plane and being spaced inwardly from the end edge of the plate, said plate being formed contiguous to each pair of shoulders with an upstanding lug, a pivot pin carried by said lug and

an abrasive sheet clamp member mounted on said pivot pin and having an abrasive sheet engaging jaw portion extending transversely of the base plate outwardly of said shoulders, said jaw portion having a length comparable to the width of said base plate, a pair of torsion springs mounted on said pivot pin at opposite sides of said lug, each of said springs having one leg thereof extending forwardly and upwardly from said pivot pin and engaging said clamp member in an area above the horizontal plane passing through said pivot pin, the opposite leg of each of said pair of springs extending rearwardly from said pivot pin and engaging a support located contiguous to said horizontal plane, and said pivot pin having limited angular movement in said lug relative to the plane of said shoulders.

**5.** An abrasive sheet carrying pad for portable power-operated sanding machines including a flat base plate formed at each end with a pair of upstanding shoulders, the shoulders of each pair being contiguous to the side edges of said plate, said shoulders being spaced apart transversely of the plate in a common plane and being spaced inwardly from the end edge of the plate, said plate being formed contiguous to each pair of shoulders with an upstanding lug, a pivot pin carried by said lug and an abrasive sheet clamp member mounted on said



pivot pin and having an abrasive sheet engaging jaw portion extending transversely of the base plate outwardly of said shoulders, said jaw portion having a length comparable to the width of said base plate, a pair of torsion springs mounted on said pivot pin at opposite sides of said lug, each of said springs having one leg thereof extending forwardly and upwardly from said pivot pin and engaging said clamp member in an area above the horizontal plane passing through said pivot pin, the opposite leg of each of said pair of springs extending rearwardly from said pivot pin and engaging a support located contiguous to said horizontal plane, the legs of said springs forming an angle of not more than 120°.

**6.** An abrasive sheet carrying pad structure as defined in claim **5**, wherein said opposite legs of said springs engage said support in close proximity to said pivot pin.

**References Cited by the Examiner**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,521,689 | 9/1950 | Champayne | 51—387 |
| 3,122,802 | 3/1964 | Kaufman | 24—253 X |


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