

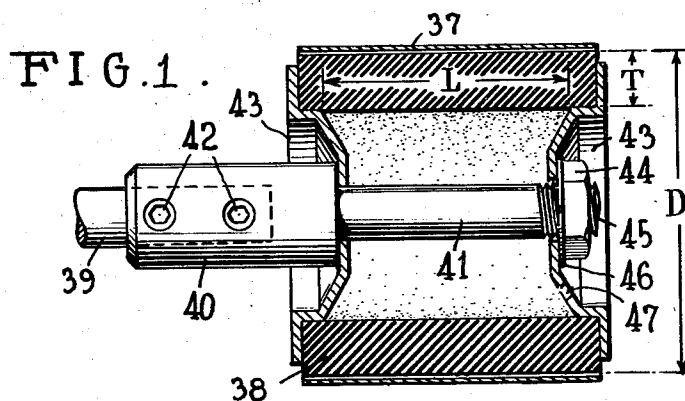
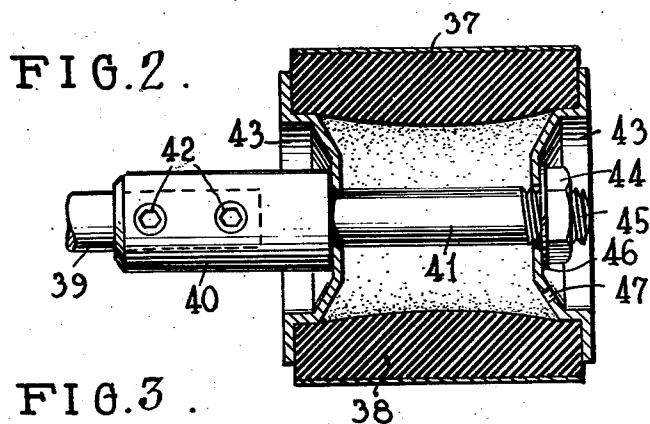
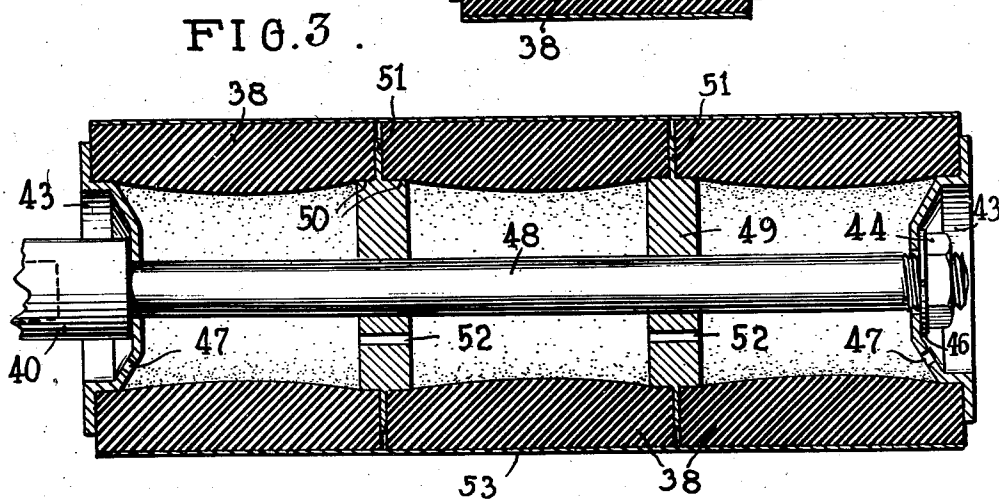
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SANDING DRUM

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SANDING DRUM

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The present invention relates to a mechanically driven rotary abrasive means of the type commonly known as a sanding drum.

An object of the invention is to improve the efficiency of a drum of this nature while at the same time simplifying its construction and consequently cheapening the same.

A further object is to provide a drum of this nature which may be extended indefinitely to any desired length by adding successive sections thereto.

A further object is to provide a sanding drum wherein a uniform yieldable pressure is applied to practically all portions of the abrasive sleeve.

Further objects and advantages of the invention will be evident from the various features set forth in the specification and defined in the claims appended thereto.

For a clear understanding of the invention reference is to be had to the accompanying drawing, illustrative of certain embodiments thereof.

In said drawing:

Fig. 1 is a longitudinal sectional elevation of a sanding drum embodying features of the invention, the resilient sleeve thereof being in its relaxed condition,

Fig. 2 is a similar view thereof with the resilient sleeve in its stressed condition, and

Fig. 3 is a longitudinal section through a sanding drum of increased length made up of a series of sections, such as those shown in Figs. 1 and 2, Fig. 3 showing the same in stressed condition.

In the various figures similar parts are designated by the same reference characters.

I have found that in order to provide a sanding drum which will retain a yieldable substantially truly cylindrical outer surface it is necessary that there be certain proportions between the unsupported length of the sleeve and its wall thickness. When the wall thickness is too great with respect to the length, an outward bulge will form near the middle of the rubber when the latter is compressed by the adjusting means, while too thin a wall, on the other hand, will cause irregular bulges and contractions to form, and usually will also cause the rubber to be thrown badly out of alignment and even to be disengaged entirely from its support, thus endangering not only the operator and the workpiece, but even the machine itself.

When properly proportioned, a drum made as shown in Figs. 1 to 3 will first expand substantially uniformly in an outward direction until the sand paper sleeve 37 is engaged by the outer surface of the yieldable material 38 and thereupon a certain amount of additional stressing of the

rubber sleeve 38 will result merely in a slight increase in the outer diameter D of the said rubber sleeve thus maintaining the same substantially truly cylindrical, while the bulk of the expansion will take place upon the inner surface of the rubber sleeve so that the condition shown in Figs. 2 and 3 will be attained.

Referring now in detail to Fig. 1 there is shown a shaft 39 adapted to receive a collar 40 carrying a shaft 41 which receives the sanding drum 10 proper. This collar 40 with its associated parts is preferably removably secured to the motor-driven shaft 39 in any desired way, for example, by means of the headless set screws 42.

The sleeve of yieldable resilient material, which may be rubber, either solid or spongy, or any other desired and suitable material having characteristics satisfactory for its purpose, is preferably mounted upon the cylindrical portions of two cupped washers 43, which for simplicity of manufacture and assembly may be identical with one another.

Each of these washers, as shown, is cupped, and the purpose of this cupping is to provide a recess which may accommodate the nut 44 which is screwed upon the threaded end 45 of the shaft 41. A washer 46, which may be a lock washer if desired, is preferably interposed between the nut 44 and the cupped washer 43, as shown. A vent 47 may be provided in one or both of the washers 43 to allow free escape of the air from within the sleeve 38 so as to prevent any accidental compression thereof which might result in inflating the sleeve 38 and undesirably altering its shape.

The purpose of the cups is two-fold; in the first place such cup provides a convenient recess to receive the nut so that the drum may be used closely up to an otherwise not readily accessible portion of a workpiece being sanded, and, in the second place, the cups provide the proper cylindrical seats for the ends of the sleeve 38. The two important dimensions of the rubber sleeve are L and T which, as shown in Fig. 1, represent respectively the unsupported length of the rubber sleeve, and the wall thickness of the sleeve.

When these dimensions L and T are properly correlated to one another the effect illustrated in Figs. 2 and 3 takes place upon compressing the rubber whereas if they are not properly correlated undesirable effects such as previously mentioned are produced. I have found that in general the best results are obtained if the length L is between four and six times the wall thickness T. These dimensions are, of course, somewhat arbitrary, but upon too great deviation from such

ratios, for example, if the length much exceeds eight times the wall thickness, the device becomes defective and ultimately inoperative for the desired purpose.

Referring now to the Fig. 3 form I have shown how it is possible to provide a sanding drum of practically any desired length in spite of the above imposed conditions which limit the dimensions of the individual rubber sleeves. This figure shows a drum made up of indentionally the same parts as those in Figs 1 and 2 with the exception that the shaft 48 within the sanding drum is, of course, lengthened proportionally and additional spacing members 49 are provided, two being shown in the specific form illustrated.

Each of these spacing members 49 is freely slidable upon the shaft 48 and is in effect a washer having two cylindrical shoulders 50 thereon, arranged on opposite sides of a flange 51. A port or vent 52 is preferably provided in each of these spacers so as to provide free communication between the various cells formed in the sanding drum when built up in sections, in order to prevent any undesirable compression of the air therein, due either to the clamping action of the nut 44 or the heating of the air by the friction of the sand-paper against the workpiece when in use.

The outwardly extending portion 51 of each member 49 is preferably made relatively thin so that the adjacent ends of the rubber sections 38 will be fairly close together, thus avoiding any gaps in the support for the sand paper sleeve 53. In this form three sections are illustrated and the action of each of these sections is, of course, identical with the action of the single section shown in Figs. 1 and 2. In this way it is possible to build up a sanding drum of any desired length while still retaining the advantages of the Fig. 1 form.

The operation of the sanding drum is, course, obvious from what has already been stated. The sand-paper or other abrasive sleeve 37, or 53, as the case may be, is first slipped over the rubber sleeve or sleeves 38 while said sleeve or sleeves are in the unstressed condition and thereupon force is applied to expand such rubber into contact with the sand-paper by tightening the nut 44.

The first result, as already stated, is to cause the rubber to expand substantially uniformly into contact with the sand-paper sleeve and thereupon additional tightening of the nut 44 will merely produce a slightly greater tension of the sand-paper without interfering with its truly cylindrical shape, the bulge of the rubber being inward in contra-distinction to the prior art forms previously mentioned.

I am aware of the fact that it has hitherto been proposed to provide an unsupported rubber sleeve as the core of a sand-paper sleeve for a sanding drum, but such devices heretofore have failed to serve the desired purpose because of the fact that the necessity of preserving certain proportions between the length and the wall thickness of the rubber sleeve had not been discovered or recognized and I, therefore, believe that I am the first to have successfully produced a sanding drum having an unsupported sleeve of this sort. I have performed numerous experiments with rubber sleeves of this nature and from a study of those which operated successfully I have been able to formulate the desired and necessary relationships between the said dimensions.

It will be noted that while in the Fig. 3 form three sections have been shown which are alike in their essential elements, this is not at all necessary and, if preferred, a drum of any desired length may be built up of individual sections which vary in length and in wall thickness so that all such sectional drums will still fall within the scope and spirit of the present invention, regardless of such individual deviations, provided that the dimensions of each yieldable section are properly selected as hereinabove specified.

While the yieldable material ordinarily preferred is rubber, either of the solid variety or the spongy variety, the invention is by no means limited to such particular material, and substances other than rubber may also be used if suitable in other respects for the purpose.

My invention relates primarily to providing a sanding drum wherein the abrasive sleeve is supported by a hollow cylindrical yieldable member which is unsupported except adjacent its ends and which is, therefore, free to expand both outwardly and inwardly, the outward expansion being, of course, limited by the sleeve of abrasive material, whereas the inward expansion is practically unlimited, within the range used in practice.

For an understanding of the spirit and scope of the invention attention is, therefore, directed to the following claims.

Having described several embodiments of the invention, it will be understood that many changes, omissions, additions, etc., can be made therein without departing from the inventive idea, and, therefore, it is not to be considered as limited to the specific structures illustrated, but only as specified in the following:

I claim:

1. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same.

2. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same, the unsupported length of each said tubular member between its supports being between four and eight times the wall thickness of the said member.

3. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate sup-

ports carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same, the unsupported length of each said tubular member between its supports being between four and six times the wall thickness of the said member.

4. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same, ports being provided in certain of the elements constituting the drum, to provide communication between the spaces within the various tubular members and the outer atmosphere to prevent compression of the air within such spaces.

5. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same, ports being provided in sufficient of said supports and supporting means to provide communication between the spaces within all the tubular members and the outer atmosphere in order to prevent compression of the air contained therein.

6. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and

holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports slidable on and carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same.

7. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports slidable on and carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same, said intermediate supports comprising spacing flanges received between the adjacent ends of successive tubular members.

8. A sanding drum comprising a plurality of aligned tubular members of yieldable material arranged substantially end to end, for receiving and holding a sleeve of abrasive material, a shaft, supporting means on said shaft cooperating with the outer ends of the terminal tubular members to support said ends of the said members concentrically with the shaft, intermediate supports carried by the shaft and supporting the adjacent intermediate ends of the members, and means for adjusting said supporting means relatively to one another to compress the tubular members between the same.

9. A sanding drum comprising a plurality of independent tubular sections arranged upon a single shaft, said sections abutting against one another substantially end to end, each section being radially yieldable, and each yieldable section being supported only at its ends.

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