Aug. 23, 1955 D. R. WICKES 2,715,804

SANDING MACHINE

Filed Nov. 25, 1953

FIG. 1

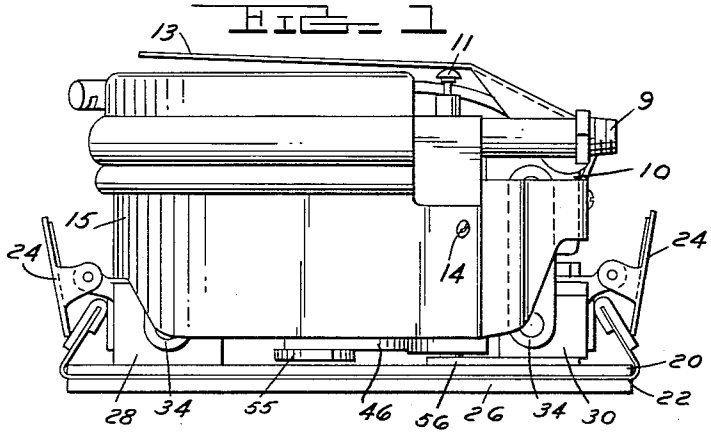


FIG. 2

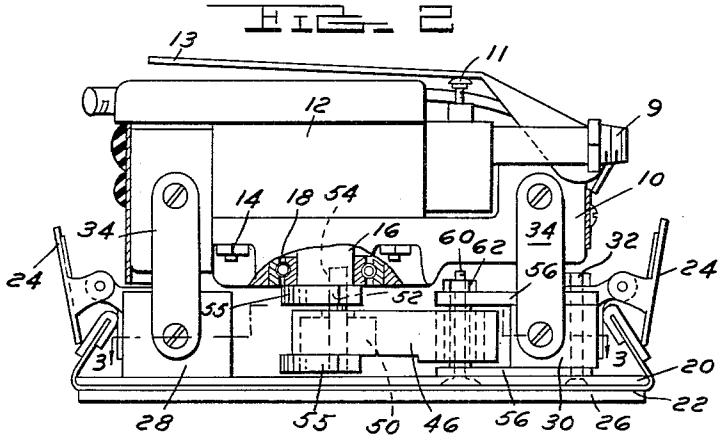


FIG. 3

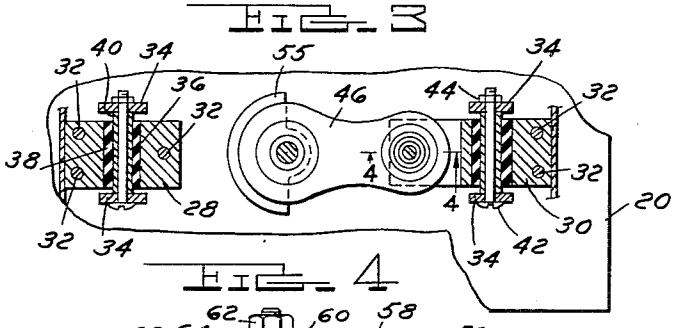
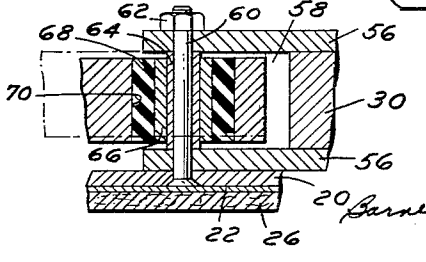


FIG. 4



INVENTOR.
DAVID R. WICKES
BY
Barnes, Kisselle, Laughlin & Price
ATTORNEYS

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SANDING MACHINE

David R. Wickes, Detroit, Mich.

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7 Claims. (Cl. 51—170)

This invention relates to a sanding machine and more particularly to a sanding machine that is arranged to be manipulated manually.

It is an object of this invention to provide a sanding machine which is compact, which is of a size and shape to be conveniently grasped and manipulated with one hand and which, at the same time, is of simple construction and incorporates a minimum of parts.

In the drawings:

Fig. 1 is a side elevational view of the sanding machine of this invention.

Fig. 2 is a side elevation of the machine with the shield broken away.

Fig. 3 is a fragmentary sectional view along the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary sectional view along the line 4—4 in Fig. 3.

Referring more particularly to the drawings, there is illustrated in Figs. 1 and 2 a sanding machine which includes a frame **10** on which a motor **12** is supported. In the embodiment illustrated, motor **12** is of the pneumatic type, but it will be appreciated as the description proceeds that the motor for driving the sander can be most any type of small motor for producting rotary motion, for example, an electrical motor. Motor **12** has an air inlet conduct **9** connected therewith. The flow of air to the motor is controlled by a valve, not shown, which is actuated by a pin **11**. An operating handle **13** is pivotally supported on frame **10** and is arranged to be depressed when the sander is grasped in the palm of the hand to actuate pin **11** and thereby admit air to motor **12**. A shield **15** is mounted on frame **10** as by screws **17** and encloses the moving parts of the sanding machine and thereby protects the operator from injury. The motor **12** is mounted on frame **10** by means of screws and nuts such as illustrated at **14**. Motor **12** has a depending shaft **16** which projects below frame **10** and is journalled at the lower side of the frame in a bearing **18**.

Below frame **10**, there is arranged a sanding plate **20** on which a padded plate **22** is slidably arranged. Plate **22** has upturned ends against which the spring clamps **24** are arranged to engage to hold a piece of sand paper on the bottom side of pad **26** which is cemented or otherwise attached to plate **22**. A pair of bearing blocks **28** and **30** are fixedly mounted on sanding plate **20** as by screws **32**. Plate **20** is pivotally supported below frame **10** by four links **34** arranged in pairs at each end of the frame. It will be observed that the bearing blocks **28** and **30** are relatively narrow as compared with the width of sanding plate **20**, and links **34** are therefore relatively closely spaced and in symmetrical relation with respect to the axial center line of plate **20**. The pivotal connections between the links and the respective members to which they are connected are the same at both the lower and the upper ends of the links. These connections at the lower ends of the links are illustrated in Fig. 3. Blocks **28** and **30** are provided with transversely extending bores **36** in which are press fitted rubber bushings **38**. The

bushings **38** are preferably formed of pure gum rubber having a high tensile strength and a Durometer hardness of about 60 to 65. These bushings can, however, be formed of neoprene having a Durometer hardness of about 50 to 55. Within each of the rubber bushings **38** there is press fitted a steel sleeve **40** which extends outwardly beyond each end of the bushings **38**. Screw **42** and nut **44** are employed for clamping the end portions of links **34** against the ends of sleeves **40**. Nuts **44** are tightened sufficiently so that links **34** are fixed and cannot rotate relative to sleeve **40**. The pivotal connections between the upper ends of lines **34** and frame **10** are the same as illustrated in Fig. 3 and therefore need not be described. It will suffice to say that with this arrangement, pivotal movement of the links with respect to the frame **10** and bearing blocks **28** and **30**, with which the links are connected at opposite ends, produces a circumferential distortion of rubber bushings **38**. Furthermore, it will be observed that as the links **34** oscillate about their pivotal connections at their upper ends with frame **10**, plate **20** is caused to oscillate back and forth along a straight line with respect to the longitudinal central axis of frame **10**.

In order to drive plate **20** from motor **12**, there is provided a connecting rod **46** which is pivotally connected at one end to bearing block **30** and which is pivotally connected at its other end to motor shaft **16**. The connection between connecting rod **46** and motor shaft **16** is generally illustrated in Fig. 2. This connection is eccentric and includes a bearing **50** seated in connecting rod **46** through which a screw **52** extends upwardly and is engaged in an off center threaded opening **54** in the lower end of motor shaft **16**. Screw **52** also secures to the lower end of shaft **16** a pair of counterbalance weights **55** arranged one above and one below connecting rod **46**. When shaft **16** is rotated, the end of connecting rod **46** that is connected to motor shaft **16** is caused to travel in an orbital path.

The pivotal connection between the other end of connecting rod **46** and bearing block **30** is best shown in Fig. 4. Bearing block **30** is provided with straps **56** on the upper and lower faces thereof which extend inwardly toward the center of the sanding machine and which provide a bifurcation **58**. Adjacent the free ends of straps **56**, holes are provided for the reception of screw **60**. Screw **60** extends upwardly through plate **20** and is provided with a nut **62** at its upper end for bringing straps **56** into a clamping engagement with the ends of a hardened steel sleeve **64**. Sleeve **64** has a close fit with a bronze bearing **66**. Bearing **66** is press fitted into a rubber bushing **68** which is in turn press fitted in a bore **70** extending vertically through the end of connecting rod **46**.

It will be observed that the use of bushings **38** at the pivotal connections between links **34** and the frame **10** at the upper ends of the links and the bearing blocks **28** and **30** at the lower end of the links provides an economical pivotal connection between these members. The use of such rubber bushings eliminates the need for expensive bearings or the like and also eliminates the problem of wear. The use of the rubber bushing **68** at the pivotal connection between the end of connecting rod **46** and bearing block **30** is also advantageous for several reasons. In the first place, it will be noted that as the links **34** oscillate back and forth, there may be a slight tendency for sanding plate **20** to rock relative to frame **10**. Since the connection between the one end of connecting rod **46** and the lower end of motor shaft **16** is more or less rigid, this tendency to rock will be absorbed by the alternate compression and expansion of bushing **68**. Bushing **68** also compensates for any misalignment at this connection.

Counterbalance weights **55** are provided for offsetting

the side thrust imposed upon the sanding plate by connecting rod **46**. Normally the connecting rod **46** would have a tendency to oscillate the sanding plate **20** in an elliptical path rather than with a straight line reciprocating movement. This would have a tendency to cause the four screws **42** extending through the upper and lower ends of links **34** to twist in a horizontal plane first in one direction and then in the opposite direction. Weights **55** are designed to substantially eliminate this twisting movement. However, even if this twisting movement is not entirely eliminated by the balance weights **55**, this twisting is absorbed by the bushings **38**.

Thus, it will be seen that I have provided a sanding machine which is of relatively simple construction but, nevertheless, is designed to produce a substantially straight line reciprocating movement of the sanding plate. The rubber bushings provided compensate for any misalignment between the members connected thereby and, at the same time, are not subject to wear as is the case with conventional bearings. Rubber bushing **68**, in addition, enables the screw **60** to tilt slightly with respect to connecting rod **46** and thus relieves any strain that might otherwise be imposed upon the pivotal connection between the lower end of motor shaft **16** and connecting rod **46** by reason of the oscillation of links **34**. The use of the hardened steel sleeve **64** having a close fit with the bronze bushing **66** is desirable for several reasons. In the first place, it enables the connecting rod to pivot freely about screw **60**. In addition, sleeve **64** is slidably arranged in bearing **66** and is therefore free to move up and down in bearing **66** as the sanding plate **20** raises and lowers in response to the pivotal movement of links **34**.

I claim:

1. In a sanding machine, the combination of a motor a frame on which said motor is mounted with the motor shaft extending downwardly through said frame, a plate below said frame on which a strip of sand paper is arranged to be attached, a pair of bearing blocks rigidly mounted on and one adjacent each end of said sanding plate, a pair of generally upright links at each end of said frame, said links having a pivotal connection at their upper ends with said frame and being journalled at their lower ends for pivotal movement on said bearing blocks, a support fixedly mounted on said plate between said bearing blocks, a connecting rod having a pivotal connection with said fixed support at one end and having an eccentric pivotal connection at its other end with the lower end of said motor shaft, said pivotal connection between said connecting rod and said fixed support including a compressible and resilient bushing which permits the connecting rod to oscillate angularly with respect to said sanding plate, and a counterbalance weight operatively connected with said motor shaft.

2. The combination set forth in claim 1 wherein said pivotal connections between said links and said frame and bearing blocks each include a rubber bushing fixed with respect to the link and the member to which the link is pivotally connected whereby pivotal action of the links produces circumferential distortion of said rubber bushings.

3. The combination set forth in claim 2 wherein said compressible and resilient bushing is fixedly mounted on said connecting rod.

4. In a sanding machine, the combination of a motor, a frame on which said motor is mounted with the motor shaft extending downwardly through said frame, a plate

below said frame on which a strip of sand paper is arranged to be attached, a pair of bearing blocks rigidly mounted on and one adjacent each end of said sanding plate, a pair of generally upright links at each end of said frame, said links having a pivotal connection at their upper ends with said frame and being journalled at their lower ends for pivotal movement on said bearing blocks, said pivotal connections each including a rubber bushing which is fixed with respect to the link and to the frame or bearing blocks to which the end of the links are connected, a support fixedly mounted on said sanding plate, a connecting rod, said connecting rod having a vertical bore therethrough adjacent one end, a rubber bushing fixedly mounted in said bore and having a sleeve fixedly supported therein, a pin arranged for rotation and vertical sliding movement in said sleeve and rigidly connected with said support for providing a pivotal connection between said plate and said connecting rod, means forming an eccentric driving connection between the other end of said connecting rod and the lower end of said motor shaft, and counterbalance weight means secured to the lower end of said motor shaft and designed to offset the natural gyrating action of the plate and the inertia of the plate resulting from said eccentric connection.

5. The combination set forth in claim 4 wherein the links of each pair are closely spaced and are arranged symmetrically with respect to the axial center line of said sanding plate.

6. The combination set forth in claim 4 wherein said pairs of links are parallel and the links in each pair are closely spaced relative to the width of said sanding plate.

7. In a sanding machine, the combination of a motor, a frame on which said motor is mounted with the motor shaft extending downwardly through said frame, a plate below said frame on which a strip of sand paper is arranged to be attached, a pair of bearing blocks rigidly mounted on and one adjacent each end of said sanding plate, a pair of generally upright links at each end of said frame, said links having a pivotal connection at their upper ends with said frame and being journalled at their lower ends for pivotal movement on said bearing blocks, a support fixedly mounted on said plate, a connecting rod extending in a plane generally parallel to the plane of said plate, said connecting rod having a vertical bore therethrough adjacent one end, a rubber bushing fixedly mounted in said bore and having a sleeve fixedly supported therein, a pin fixedly mounted on said support, said pin extending through said sleeve, said sleeve being freely rotatable on said pin and having a shorter vertical extent than said pin so that the sleeve is also free to slide vertically on said pin, said pin providing a driving connection between said plate and said connecting rod, means forming an eccentric driving connection between the other end of said connecting rod and the lower end of said motor shaft and counterbalance weight means secured to the lower end of said motor shaft and designed to offset the natural gyrating action of the plate and the inertia of the plate resulting from said eccentric connection.

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