May 8, 1962 J. E. EVERSOLE 3,032,931

OSCILLATING ABRASIVE DRUM

Filed Aug. 1, 1960

FIG. 1.

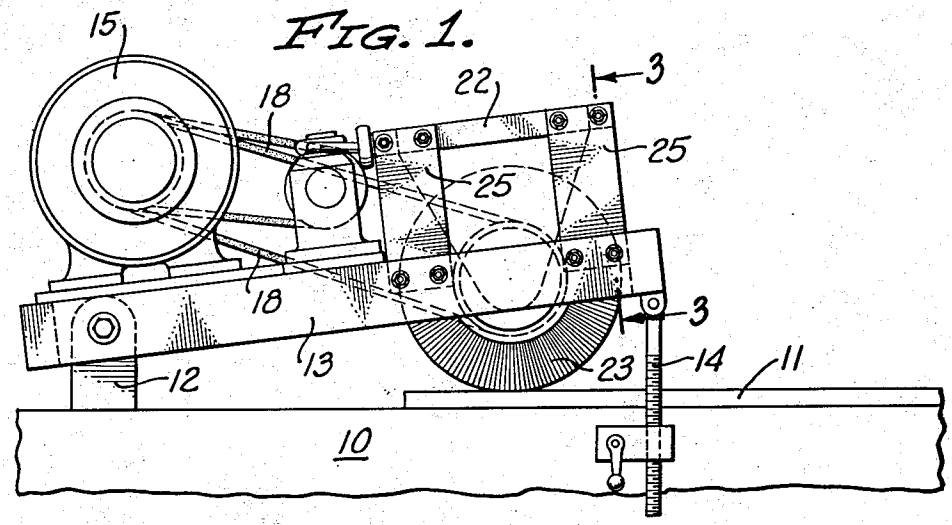


FIG. 2.

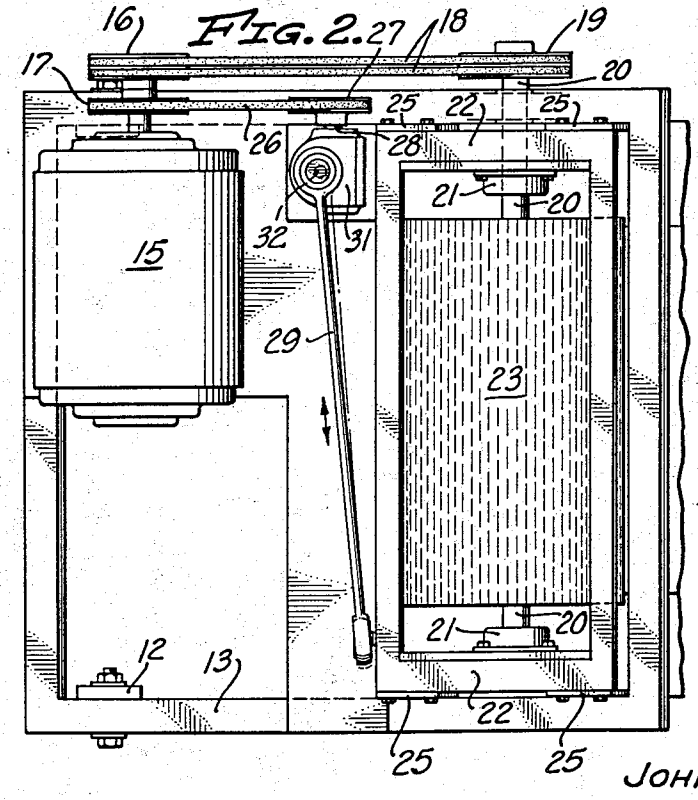
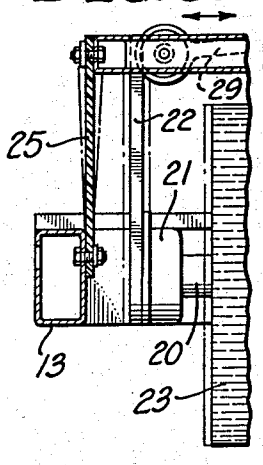


FIG. 3.



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OSCILLATING ABRASIVE DRUM

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This invention relates to an oscillating abrasive drum.

In sanding, polishing or otherwise abrading the surfaces of flat workpieces which are passed beneath a rotatable abrasive drum, undesirable straight lines or streaks often appear on the surface of the workpiece. These streaks are apparently caused to some extent by imperfections in the abrasive material and to some extent by imbalance of the abrasive drum.

It is an object of my invention to provide an abrasive drum assembly in which such markings are reduced to a minimum. This is accomplished by oscillating the abrasive drum during its rotation in order to minimize the effects of whatever markings may appear and by providing an oscillating drum mounting which does not emphasize or increase the deleterious effects resulting from imbalance of the drum.

The abrasive drum and the abrasive loading which it carries can never be perfectly balanced. Since any looseness in the drum mounting magnifies the inherent imbalance of the drum, it is desirable to have as rigid a mounting as possible. It is accordingly an object of my invention to provide an oscillating drum assembly in which the mounting is as rigid as possible, while still permitting oscillatory movement of the abrasive drum during rotation thereof.

It is a further object of my invention to provide a drum mounting which permits simultaneous rotation and oscillation of the drum and particularly to provide such a mounting which is not adversely affected by abrasive particles which are necessarily present in the air during operation of the device.

A more particular object of my invention is to provide an oscillating abrasive drum structure in which the drum mounting utilizes no moving parts or joints which can cause vibration or develop looseness or play due to wear.

In essence, my invention contemplates mounting the abrasive drum on a drum frame which is resiliently supported by one or more spring supports formed of resilient plastic or metal, preferably in laminated flat sheet form. The spring supports are rigidly secured at one end to the drum frame and at the other end to a stationary frame or bed. Suitable means is provided for rotating and oscillating the abrasive drum simultaneously, with the spring supports flexing to permit axial oscillatory movement of the drum frame with respect to the work sheets beneath it.

My invention also comprises such other objects, advantages and capabilities as will later more fully appear and which are inherently possessed by my invention.

While I have shown in the accompanying drawings a preferred embodiment of my invention, it should be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

Referring to the drawings:

FIG. 1 is a side elevational view of my oscillating abrasive drum;

FIG. 2 is a top plan view of the same;

FIG. 3 is a sectional view of the same, taken on line 3—3 of FIG. 1, with movement of the parts during oscillation indicated by phantom lines.

A preferred embodiment which has been selected to illustrate my invention comprises a table or bed 10, along which a flat piece of sheet stock 11 is adapted to be moved. Extending upwardly from opposite sides of the bed 10 are a pair of brackets 12 on which there is pivotally mounted the rear end of a main frame 13. The front end of the main frame 13 is supported by a pair of threaded bolts 14, so that the height of the main frame 13 can be adjusted with respect to the bed 10.

Mounted on the rear portion of the main frame 13 is an electric motor 15, which rotates a pair of drive pulleys 16 and 17. The drive pulley 16 drives a pair of parallel belts 18 which are mounted around a drum pulley 19. The drum pulley 19 is mounted on the end of an elongated rotatable shaft 20. The shaft 20 is journaled in a pair of bearings 21 which are secured to the inside of a drum frame 22. Mounted on the shaft 20 between the bearings 21 is an elongated cylindrical abrasive drum 23, which includes a plurality of radially directed abrasive leaves. The abrasive drum 23 extends transversely with respect to the workpiece or sheet stock 11.

The drum frame 22 is supported with respect to the main frame 13 by four spring supports 25. These spring supports 25 comprise flat sheets or plates of plastic or metal which has resilient properties. A plastic such as micarta has been found to be satisfactory for this purpose. The upper ends of the spring supports 25 are bolted or otherwise fixedly secured to the upper portion of the drum frame 22, while their lower ends are bolted or otherwise fixedly secured to the front end of the main frame 13.

The other drive pulley 17 drives an oscillator belt 26, which extends around an oscillator pulley 27. The oscillator pulley 27 is mounted on the end of a shaft 28, which is connected through a right angular gear reduction box 31 to a vertically directed shaft 32. One end of an oscillator rod 29 is connected to the shaft 32 by an eccentric off-center connection whereby rotation of the shafts 28 and 32 results in longitudinal oscillatory movement of the rod 29. The opposite end of the rod 29 is connected to the opposite end of the drum frame 22.

As the motor 15 operates, it drives the pulley wheels 16 and 17, which through the belts 18 and 26 drive the pulleys 19 and 27. The pulleys 19 in turn rotates the shaft 20, causing the abrasive drum 23 to rotate. The oscillator pulley 27 drives the eccentrically mounted oscillator rod 29, causing the drum frame 22 to oscillate along the longitudinal axis of the abrasive drum 23 while the abrasive drum 23 is rotating.

While any desired speeds and types of operation may be used, an example which may be given is that the abrasive drum 23 was rotated at a speed of approximately fifteen hundred revolutions per minute while the drum frame 22 was oscillated at a frequency of one hundred and twenty cycles per minute. The range of oscillation of the drum frame 22 was approximately one-quarter inch to each side, making a total overall stroke of approximately one-half inch of oscillation of the abrasive drum 23 with respect to the workpiece 11.

It will be noted that the spring supports 25 support the drum frame 22 for oscillation with respect to the main frame 13 without the use of any moving parts or conventional joints. The ends of the spring supports 25 are rigidly secured to the drum frame 22 and the main frame 13. All of the yielding movement of the drum frame 22 with respect to the main frame 13 and the workpiece 11 is obtained from the resilience of the spring supports 25. This structure is simpler than any form of linkage and has no joints or moving parts which are subject to developing looseness or play due to wear.

While the sheet 11 has been described as being moved past the drum 23, it is also possible to move the drum 23 while the sheet 11 remains stationary. It is only necessary that there be relative movement between the sheet 11 and drum 23.

I claim:

1. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum extending substantially transversely across said bed, means for rotating abrasive drum, at least one spring support holding said drum above said bed, said spring support being adapted to flex in the direction of the longitudinal axis of said abrasive drum, and means for oscillating said abrasive drum axially so that said abrasive drum is rotated and oscillated simultaneously with respect to said bed.

2. In an oscillating abrasive drum assembly, means for mounting an abrasive drum for simultaneous rotation and oscillation comprising at least one spring support for said abrasive drum, said spring support being adapted to flex in the direction of the longitudinal axis of said abrasive drum.

3. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum extending substantially transversely across said bed, means for rotating said abrasive drum, a plurality of spring supports holding said drum above said bed, each of said spring supports being secured at one end with respect to said drum and at the other end with respect to a stationary portion of said assembly, said spring supports being adapted to flex in the direction of the longitudinal axis of said abrasive drum, and means for oscillating said drum axially so that said abrasive drum is rotated and oscillated simultaneously with respect to said bed.

4. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum extending substantially transversely across said bed, means for rotating said abrasive drum, said abrasive drum being mounted on a drum frame, at least one spring support holding said drum frame above said bed, said spring support being adapted to flex in the direction of the longitudinal axis of said abrasive drum, and means for oscillating said drum frame axially so that said abrasive drum is rotated and oscillated simultaneously with respect to said bed.

5. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum extending substantially transversely across said bed, means for rotating said abrasive drum, said abrasive drum being mounted on a drum frame, a plurality of spring supports holding said drum frame above said bed, each of said spring supports being secured at one end to said drum frame and at the other end to a stationary portion of said assembly, said spring suports being adapted to flex in the direction of the longitudinal axis of said abrasive drum, and means for oscillating said drum frame axially so that said abrasive drum is rotated and oscillated simultaneously with respect to said bed.

6. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum mounted on a shaft extending substantially transversely across said bed, a motor for rotating said shaft, said shaft being mounted on a drum frame, at least one spring support disposed at each end of said drum frame, said spring supports holding said drum frame above said bed, said spring supports being flexible in the direction of the longitudinal axis of said abrasive drum, and means for oscillating said drum frame axially with respect to said bed so that said abrasive drum is oscillated along its longitudinal axis simultaneously with its rotation.

7. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum mounted on a shaft extending substantially transversely across said bed, said abrasive drum having a plurality of radially directed abrasive leaves, a motor for rotating said shaft, said shaft being mounted on a drum frame, at least one spring support disposed at each end of said drum frame, said spring supports holding said drum frame above said bed, said spring supports being flexible in the direction of the longitudinal axis of said abrasive drum, each of said spring supports being fixedly secured at one end to said drum frame and at the other end to a stationary portion of said assembly, an oscillating rod connected at one end thereof to said drum frame, the other end of said oscillating rod being connected to said motor for reciprocal movement of said rod by said motor to oscillate said drum frame axially with respect to said bed so that said abrasive drum is oscillated along its longitudinal axis simultaneously with its rotation.

8. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum mounted on a shaft extending substantially transversely across said bed, a motor for rotating said shaft, said shaft being journaled adjacent its opposite ends in a pair of bearings, said bearings being mounted on the opposite end of a drum frame, a pair of spring supports disposed at each end of said drum frame, each of said spring supports comprising a wide flat sheet of resilient material, each of said spring supports being fixedly secured at its upper end to said drum frame and at its lower end to a stationary portion of said assembly, said spring supports being adapted to flex in the direction of the longitudinal axis of said abrasive drum, and means for oscillating said drum frame axially with respect to said bed so that said abrasive drum is oscillated along its longitudinal axis simultaneously with its rotation.

9. The structure described in claim 8, said means for oscillating said drum frame comprising an oscillating rod connected at one end thereof to said drum frame, the other end of said oscillating rod being eccentrically connected to said motor for reciprocal movement of said rod by said motor.

10. An oscillating abrasive drum assembly comprising a work supporting bed, an abrasive drum extending substantially transversely across said bed, means for rotating said abrasive drum, said abrasive drum being mounted on a drum frame, a plurality of spring supports holding said drum frame above said bed, each of said spring supports being formed of substantially rigid sheet material which is inherently resilient whereby said spring supports are adapted to flex along the longitudinal axis of said abrasive drum, and means for oscillating said drum frame axially so that said abrasive drum is rotated and oscillated simultaneously with respect to said bed.

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