

Oct. 27, 1970

E. C. DUDEK

3,535,829

BELT CLEANERS FOR BELT SANDERS

Filed May 21, 1968

2 Sheets-Sheet 1

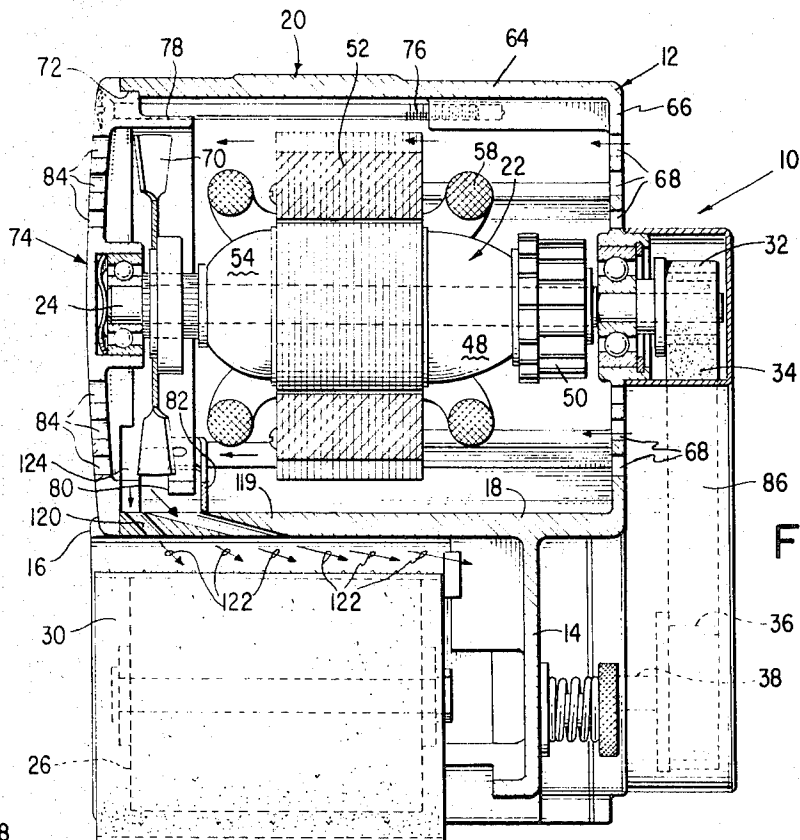


Fig. 1.

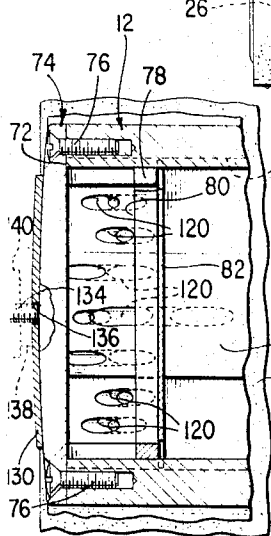


Fig. 3.

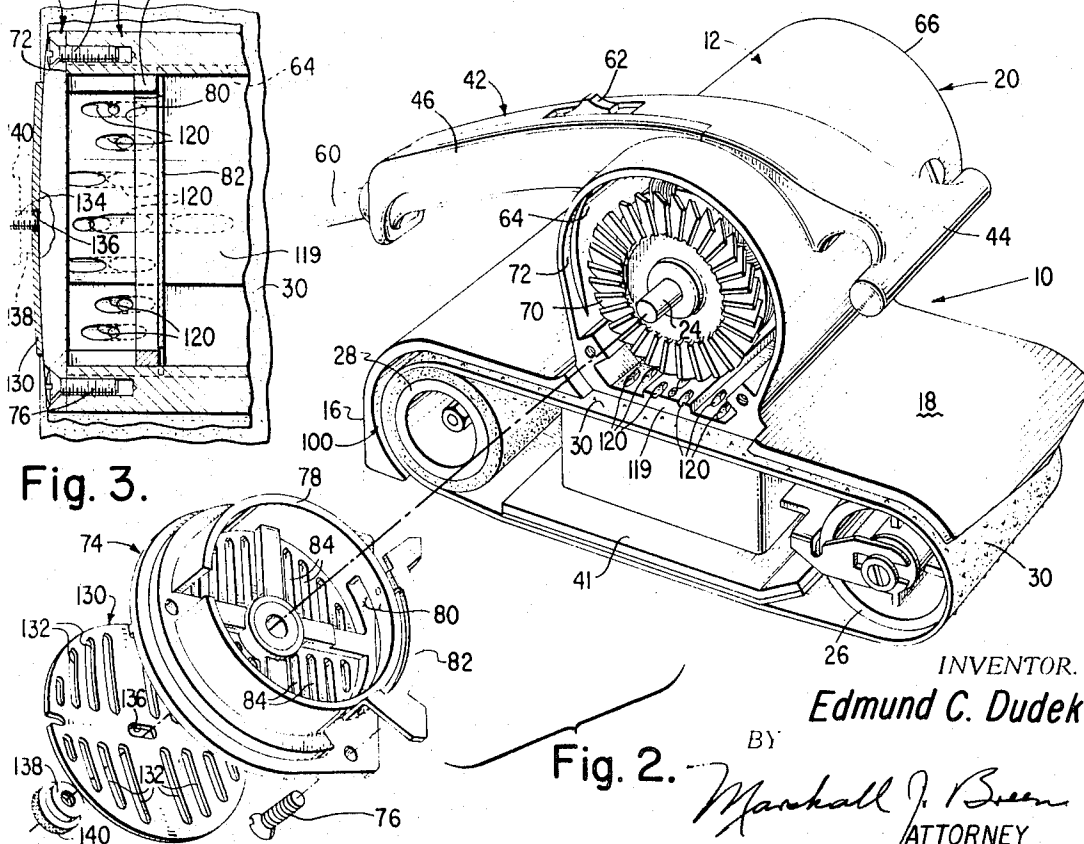


Fig. 2.

INVENTOR.
Edmund C. Dudek

BY
Marshall J. Breen
ATTORNEY

Oct. 27, 1970

E. C. DUDEK

3,535,829

BELT CLEANERS FOR BELT SANDERS

Filed May 21, 1968

2 Sheets-Sheet 2

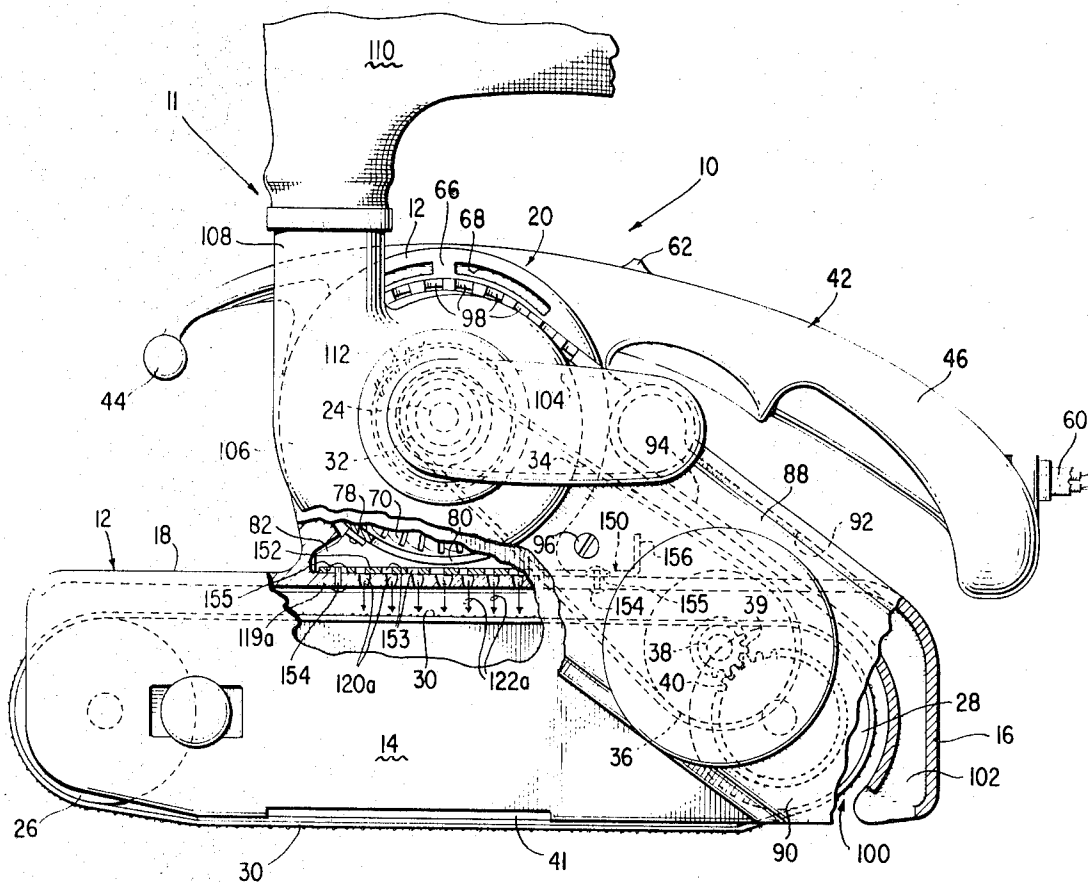


Fig. 4.

WITNESS

Nicholas Leszczak

INVENTOR.

Edmund C. Dudek

BY

Marshall J. Breen
ATTORNEY

1

3,535,829

BELT CLEANERS FOR BELT SANDERS

Edmund C. Dudek, Oakbrook, Ill., assignor to The Singer Company, New York, N.Y., a corporation of New Jersey

Filed May 21, 1968, Ser. No. 730,763

Int. Cl. B24b 23/00, 55/00

U.S. Cl. 51—170

8 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a belt cleaner for a belt sander in which a portion of the motor cooling air is delivered at high velocity through nozzles or holes upon the upper sides of the belt as it moves past the motor housing substantially between the drive and idler pulleys to blow off the packed dust and debris that has collected on the sanding belt.

The holes which direct the motor exhaust air may be in the form of nozzles, the location, size and angle of direction of which are suitably selected to clean substantially the entire width of the sanding belt, without adversely affecting the motor cooling. The holes may be either drilled or diecast, as desired.

The belt cleaner may be used in combination with a conventional dust pickup system for the belt sanders.

BACKGROUND OF THE INVENTION

In the prior art the sanding belt of a belt sander was cleaned manually, which proved to be both time consuming and generally inefficient. Furthermore, the longer a particular belt was used the more frequent the sanding operation had to be interrupted to clean the belt due to clogging and collection of the dust and debris thereon.

A partial solution has been the use of a dust pickup system in which a built-in or otherwise attached vacuum cleaner is used in combination with the belt sander to remove dust and debris from the work surface in the immediate area of the belt sander, usually at the rear of the base thereof. While this may be helpful, in that it tends to limit the build-up of dust, it is not the ultimate solution since it failed to prevent the dust from packing on the sanding belt.

SUMMARY OF THE INVENTION

In accordance with the present invention the novel belt cleaner is provided for a belt sander having a motor mounted into the frame thereof, which frame rotatably supports a pair of spaced drums one of which is driven by the motor and upon which a sanding belt is operatively connected. The motor is cooled by a fan drawing air through a motor housing of the frame disposed adjacent the sanding belt and separated therefrom by a partition wall. A plurality of nozzle apertures or holes are formed in the partition wall to direct a portion of the cooling air at high velocity into contact with and against the abrasive surface of the sanding belt so as to loosen and substantially remove the collected dust and debris thereon. In some types of belt sanders the belt cleaner fan may be separately housed or the nozzles located remotely from the motor or fan housing in a suitable wall or conduit.

It is therefore an object of the present invention to provide an improved belt cleaner for belt sanders which overcomes the prior art disadvantages; which is simple, economical and reliable; which combines pneumatic cleaning of the sanding belts with vacuum pickup of the dust; which has pneumatic cleaning of the sanding

2

belt by high velocity air; which has pneumatic cleaning of the sanding belt substantially along the full width thereof; which has an adjustable outlet nozzle to control the velocity and volume of pneumatic air directed to clean the sanding belt; which has an adjustable discharge from the motor housing to selectively increase the portion of air delivered through the pneumatic nozzles to clean the sanding belt; which controls the passage of air through the motor housing to adjust the quantity and volume of the air passing through the nozzles to clean the sanding belt; and, which permits cleaning of the sanding belt without adversely affecting the motor cooling.

Other objects and advantages will be apparent from the following description of several embodiments of the invention and the novel features will be particularly pointed out hereinafter in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention is illustrated in the accompanying drawings in which:

FIG. 1 is a sectional view taken through the motor housing and base of the frame of a belt sander embodying one form of the present invention.

FIG. 2 is a perspective view, partially exploded, of the belt sander embodying another form of the present invention.

FIG. 3 is a sectional top plan view taken above the partition wall of the motor housing looking downwardly toward the base of the belt sander of FIG. 2.

FIG. 4 is a side elevational view, partly in section, of the belt sander having an integral dust pickup system, and embodying still another form of the present invention.

DESCRIPTION OF THE INVENTION

In the present invention, one form is shown in FIG. 1, another form is shown in FIGS. 2 and 3, and still another form is shown in FIG. 4; but in all cases, the present invention is embodied in an otherwise conventional belt sander 10, which machine remains basically unchanged, except for the addition of an integral dust pickup system 11 depicted in FIG. 4, and of course, the different component parts of the various forms of the present invention.

Accordingly, the portable belt sander 10, illustrated in FIGS. 1, 2 and 4 has a main frame or housing 12 including a side wall 14, and end wall 16, and a substantially horizontal upper wall 18. Rising from the upper wall 18 and integral with the frame 12 is a cylindrical motor housing 20 within which is mounted an electric driving motor 22 having a shaft 24 journaled longitudinally within the housing 20, and transverse to the frame 12.

The frame 12 supports a pair of revolvable drums or pulleys 26 and 28 located adjacent the longitudinal ends thereof, and an endless flexible sanding belt 30 is trained over the drums. The forward drum 26 is the idler drum, while the rearward drum 28 is the driving drum and is operatively connected and driven by the electric motor 22.

The motor shaft 24 carries a toothed pulley 32, illustrated in FIGS. 1 and 4, which drives a timing belt 34 the other end of which drives a toothed pulley suitably 36 mounted to the frame 12 by a stub shaft 38. The stub shaft 38 carries a pinion 39 which meshes with and drives a gear 40 fixed for rotation with the driving drum 28. It will be seen from FIG. 4 that clockwise rotation of the shaft 24 results in counterclockwise rotation of the drum 28 thereby moving the lower ply of the belt 30 rearwardly along the base of the housing 12. A sole plate 41 provides a backing support for the sanding belt 30 as the abrasive

surface thereof is pressed against the surface of the work piece.

The belt sander 10 is conveniently carried or manipulated by a handle 42 cast integrally with the motor housing 20 and having a forward grip portion 44 and an aft grip portion 46.

The electric motor 22 has an armature 48 and a commutator 50 carried on the shaft 24 with a field 52 disposed in superposition to the armature 50, with dielectrically mounted brush assemblies (not shown) engaging the commutator 50. Stacked steel laminations make up the core for the armature 48 and the field 52, about which is disposed an armature winding 54 and a field winding 58, respectively. An electrically conducting cable 60 is connected to a conventional source of electrical power and extends into the rear of the handle 42 to be suitably connected in circuit with a slide switch 62 and the motor 22, which motor is operated upon actuation of the switch 62 in the usual manner.

The motor housing 20 is formed with a cylindrical body portion 64 extending transversely of the frame 12 and a common portion with the horizontal upper wall 18. A centrally apertured closed end 66 journals the motor shaft 24 at the drive pulley 32 end and has a plurality of elongated slots 68 therein serving as inlets for cooling air. A fan 70 is seated on the shaft adjacent the opposite open end 72 which is closed by an end cover 74 which journals the other end of shaft 24 and is threadedly secured by screws 76 to the body portion 64. The end cover 74 has an inwardly extending annular flange 78 having an elongated slot 80 extending along the bottom thereof adjacent to which is carried a baffle plate 82 which among other things properly orientates the seating of the cover 74 within the cylindrical body portion 64. A plurality of elongated horizontal slots 84 are formed in the vertical wall of the cover 74 to serve as an outlet for the cooling air which had been drawn into the motor housing 20 through the inlet slots 68.

A belt guard 86 is suitably connected to the frame 12 of the sander 10 shown in FIG. 1 to cover the timing belt 34 and prevent accidental contact therewith. However, as shown in FIG. 4, when the dust pickup system 11 is used in combination with the belt sander 10 a cover element 88 replaces the belt guard 86 which element includes a belt guard portion 90 and suction conduit 92 separated from the guard portion by a transverse partition 94. The cover element 88 is secured to the frame 12 by means of a threaded screw 96. The belt guard portion 90 houses the belt 34 and communicates with the atmosphere through a series of ventilating apertures 98.

A dust chamber 100 is formed on the underside of the upper wall 18 and is bounded by the side walls 14 and end wall 16 to define the opening in which the sanding belt 30 is mounted upon the pulleys 26 and 28. The end wall 16, as shown in FIG. 4, includes an integrally formed passage 102 the lower end of which opens to communicate with the dust chamber 100, and the upper end of which connects into the conduit 92. The upper end of conduit 92 is connected through a line 104 the other end of which connects into the inlet of a molded plastic scroll housing 106, the outlet of which is shown at 108 to carry a dust collection bag 110. A blower impeller 112 is centrally disposed in the housing 106 and is connected to the outboard end of the toothed pulley 32 to be driven thereby. The housing 106 may be suitably secured to the cover element 88 by cementing or the like. Upon operation of the belt sander 10 dust is exhausted from the chamber 100 into the passage 102 which leads through conduit 92 and line 104 to the blower 112 for discharge through outlet 108 into the bag 110 so as to complete the cycle operation of the dust pickup system 11.

In the embodiment of the invention, illustrated in FIG. 1, a plurality of holes 120 are formed at the fan end of the cylindrical body portion 64 at the portion thereof common with the horizontal upper wall 18, which common

portion is generally designated as 119. The holes 120 are disposed under the slot 80 of the end cover 74 and between said end cover and baffle plate 82. The holes 120 are formed along the full length of the common portion 119 at varying distances from the outer end of said portion. The holes 120 may be formed by drilling or die-casting in a suitable nozzle shape at varying angles of inclination to direct a stream of high velocity all along substantially the entire width of the sanding belt 30, as represented by the arrows 112 exiting from the holes 120 in FIG. 1.

The holes 120 in the FIG. 1 embodiment are substantially the same as the holes 120 shown in the FIGS. 2 and 3 embodiment of the present invention, so that they may all be viewed together.

A portion of the air drawn by the fan 70 through the inlet slots 68 to cool the motor 22 will be delivered for discharge through the holes 120. The supply of a predetermined volume of belt cleaning air is ensured by providing a baffle plate 82 spaced inwardly from the upper opening of the inwardmost hole 120 serves to form a chamber 124 from which the air exits through holes 120 to impinge directly upon or flow transversely along the width of the sanding belt 30. The cleaning air acts to blow away the dust and debris which would otherwise collect thereupon, while the baffle 82 sets the transverse limits of the upper opening of holes 120 within the common portion 119. The holes 120 extend underneath the baffle plate 82 so that the discharge side thereof lies past the midway point of the sanding belt 30 at an inclination which causes the direct stream of air passing therethrough to impinge the sanding belt 30 at a point three quarters the way in from the outer end thereof. In this way it will be seen that though the holes 120 have their upper openings confined to the chamber 124, the discharge side of said holes are not so limited, and may in fact deliver air along the greater portion of the entire width of the sanding belt 30.

The FIGS. 2 and 3 embodiment of the present invention includes an adjustable closure member 130 having a plurality of slots 132 formed to align with the slots 84 of the end cover in an adjustable manner. The end cover carries a stud 134 that passes through an elongated vertical central slots 136 to threadedly engage a nut 138 having an enlarged diamond knurled head 140 which enables easy operator turning thereof. In the normal position the slots 132 in the member 130 will be in perfect alignment with the slots 84 in the end cover 74. The effect of this will be to duplicate the belt cleaning results obtained in the embodiment shown and described in FIG. 1 in that a predetermined portion of the cooling air will be diverted from the discharge slots 84 into chamber 124 for discharge through the holes 120 along substantially the full width of the sanding belt 30. If it is desired to change the proportions of air exiting the slots 84 and holes 120 the embodiment shown and described in FIGS. 2 and 3 illustrates one way in which this may be done. The operator will grasp the head 140 to turn and loosen the nut 138 to allow the member 130 to be shifted along the confines of the slot 136 to an adjusted position whereby the slots 132 overlap the slots 84 and effect at least a partial closing thereof. The nut 138 is then tightened to clamp the member 130 in the adjusted position. This has the dual result of reducing the total throughput of cooling air and increasing the total quantity of cleaning air passing through holes 120. Of course, the slots 132 should not be closed to the point which would cause motor overheating, but since the extent of the closure of the slots 84 is somewhat dependent upon the load of the motor 22 it remains for the operator to determine the most beneficial setting of the member 30.

In the embodiment of the invention shown in FIG. 4 provisions have been made to flatten the stepped common wall, designated generally as 119a, and once again form a plurality of nozzle shaped holes 120a therein through

5

which high velocity cleaning air will be discharged against the upper surface of the sanding belt 30 as characterized by the arrows 122a. In this embodiment the throughput flow of the cooling air is never lessened so as to completely remove operator judgment or the danger of overheating the motor 22, instead a slide valve member 150 extends through a slot (not shown) located in line with the fan 70 and on the rearward side of the cylindrical body portion 64, just above the level of the upper wall 18. This places a plate portion 152 of the member 150 in superposition to the openings 120a. The plate portion 152 has a plurality of apertures 153 therein adapted to align corresponding to the openings 120a, and thus permit a maximum flow of cleaning air through the holes 120a. Pins 154 are fastened to the walls and extend into elongated slots 155 formed at opposite ends of the slide plate 152 to limit the movement thereof, while permitting the operator to move a handle 156 and change the relative position of the apertures 153 with respect to the holes 120a. This will reduce the size of the openings of hole 120a and modify the nozzle effect thereof so as to change the characteristics of the cleaning air. The changed characteristics of the cleaning air may be highly desirable for certain sanding operations which do not require the full velocity force of the cleaning air stream upon the upper surface of the sanding belt 30, and one apparent result will be an increased life for said belt.

In the FIG. 4 embodiment of the present invention the dust and debris blown from the sanding belt 30 passes from the dust chamber 100 to be collected in the dust pickup system 11 and ultimately be collected in the bag 110. In other words combining the present invention with the dust pickup system 11 prevents the formation of clouds of dust and debris which otherwise would interfere with the operator visibility and permits longer periods of uninterrupted operation of the belt sander 10.

Regardless of which embodiment of the invention is used the principles of operation remain unchanged since as the sanding belt is packed with dust its ability to sand is continuously diminished. In summary, a portion of the motor cooling air is fed through nozzle-like holes or openings 120 in the frame 12 wall in superposition to the upper surface of the sanding belt 30 which air impinges or passes at high velocity thereover to remove all or a large portion of the packed dust and debris on said belt to clean the same.

It will be understood that various changes in the details, materials, arrangements of parts and operating conditions which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principles and scope of the invention as expressed in the claims.

Having thus set forth the nature of the invention, what I claim herein is:

1. A belt cleaner device for a portable power operated sander having a frame in which a pair of laterally extending drums are rotatably mounted on the frame to support an endless sanding belt thereon and be driven by a motor carried by the frame, said belt cleaner device comprising:

- (a) a housing having a fan portion,
- (b) a fan means rotatably disposed in the fan portion of the housing to be operatively driven by the motor, and
- (c) nozzle means disposed adjacent to the sanding belt, and in communication with the fan portion of the

6

housing to deliver a stream of air upon the sanding belt substantially to remove packed dust and debris thereon.

2. The combination claimed in claim 1 wherein:

- (a) the housing has the motor mounted therein,
- (b) the housing is connected to the frame above the sanding belt,
- (c) the fan portion of the housing includes a wall means disposed adjacent to the sanding belt, and
- (d) the nozzle means are formed in said wall means to deliver streams of air across the width of the sanding belt to clean the same.

3. The combination claimed in claim 2 wherein:

- (a) the fan means draws air through the housing to cool the motor, and
- (b) a baffle means is disposed in the housing to define chamber means for the nozzle means and to aid in delivering a portion of the cooling air for discharge through said nozzle means.

4. The combination claimed in claim 3 wherein:

- (a) the nozzle means are disposed in spaced relation to each other at varying angles of inclination to direct streams of air substantially across the width of the sanding belt.

5. The combination claimed in claim 3 wherein:

- (a) the housing has inlet and discharge apertures through which the cooling air passes, and
- (b) a closing member adjustably mounted to the housing adapted to selectively partially close the discharge aperture whereby a smaller than normal portion of the cooling air is discharged from said discharge aperture, and a larger than normal portion of the cooling air is directed through the nozzle means.

6. The combination claimed in claim 3 wherein:

- (a) a plate means is shiftably mounted in the fan portion of the housing, and
- (b) the plate means has a plurality of apertures therein normally disposed in alignment to the nozzle means and adapted to be operator shifted to reduce the size of the opening for the nozzle means.

7. The combination claimed in claim 6 wherein:

- (a) a handle is formed on the plate means to extend outwardly of the housing, and
- (b) the plate means and the handle defining a slide valve slideably mounted in said housing.

8. The combination claimed in claim 3 wherein:

- (a) a dust pickup system operatively connected to said sander, and
- (b) said belt cleaner device to blow the dust and debris from the sanding belt whereby said dust and debris will be collected by the dust pickup system.

References Cited

UNITED STATES PATENTS

3,417,511	12/1968	Dudek	51—135
2,654,190	10/1953	Mitchell	51—170.4
2,000,784	5/1935	Myers	51—170.4
1,969,318	8/1934	Myers	51—170.4

JAMES L. JONES, Jr., Primary Examiner

U.S. Cl. X.R.

51—262