Dec. 4, 1934. A. N. EMMONS 1,983,277

DISK SANDER

Filed Dec. 24, 1932 4 Sheets-Sheet 1

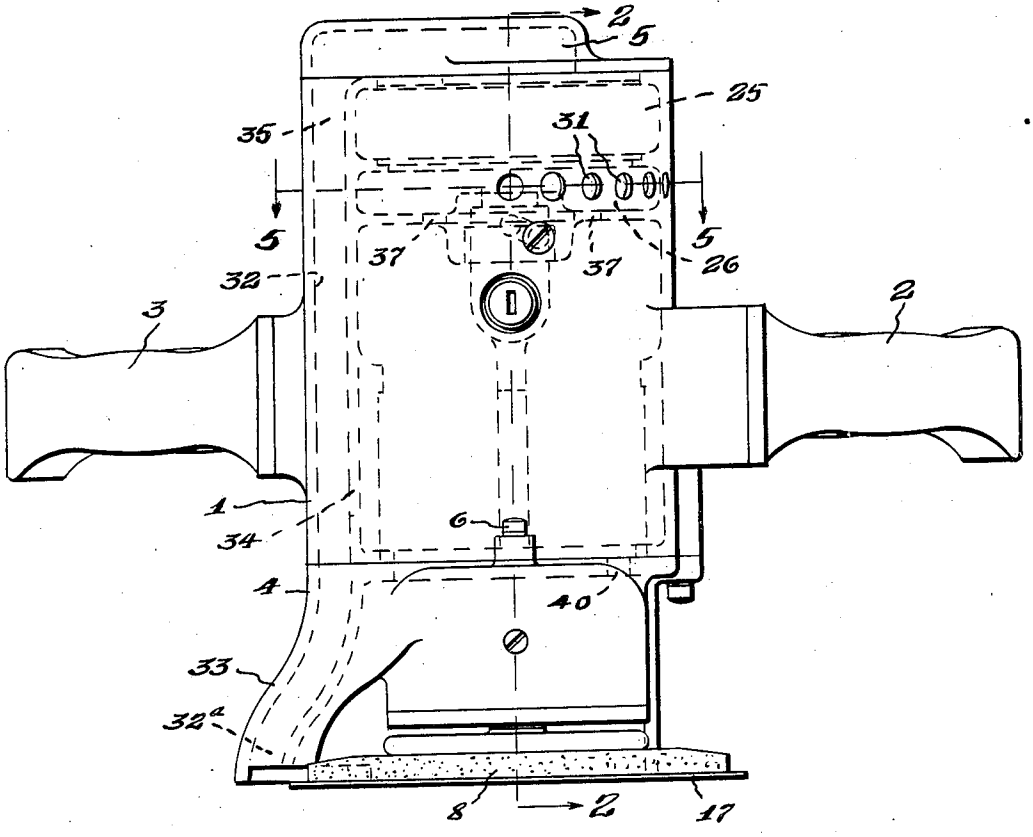


Fig. 1.

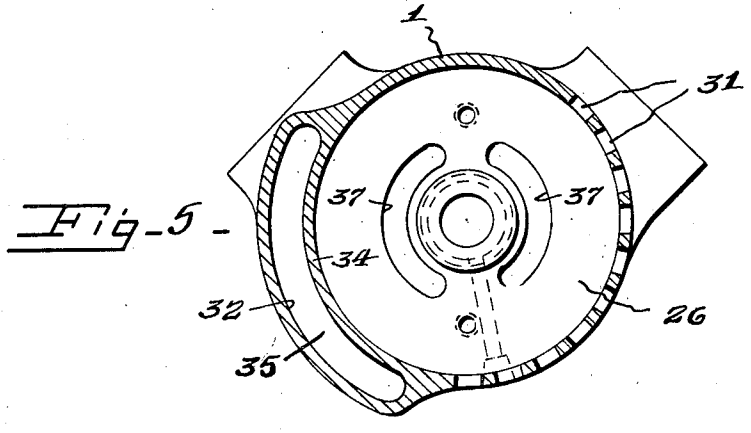


Fig. 5.

INVENTOR.
Arthur N. Emmons
BY Bodell & Thompson
ATTORNEYS.

Dec. 4, 1934. A. N. EMMONS 1,983,277

DISK SANDER

Filed Dec. 24, 1932 4 Sheets-Sheet 2

Fig-3-

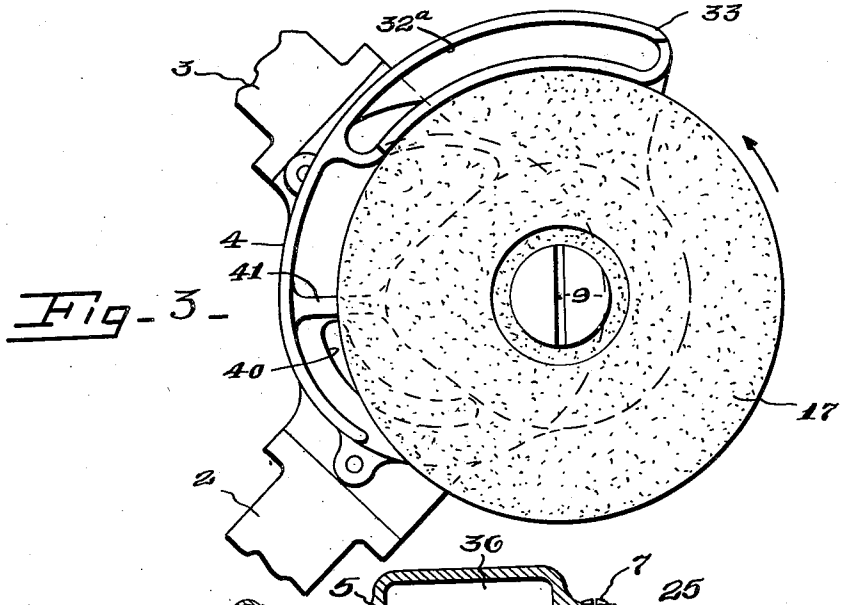
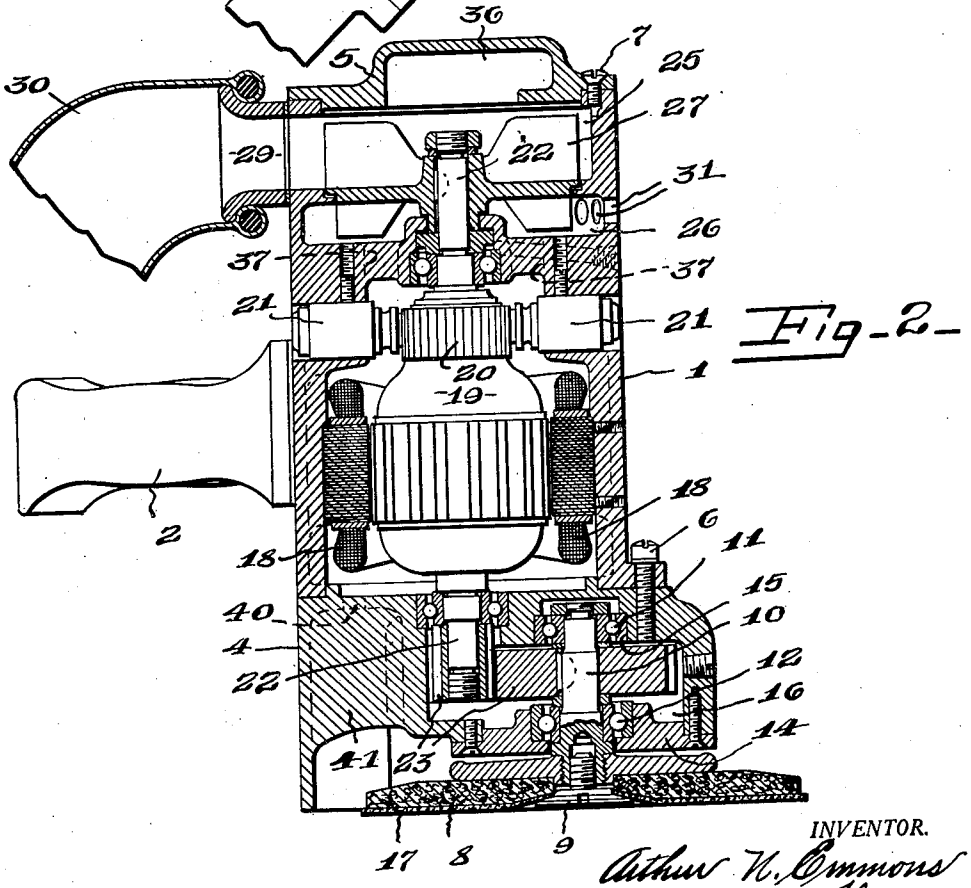


Fig-2-



INVENTOR.
Arthur N. Emmons
BY Bodell & Thompson
ATTORNEYS.

Dec. 4, 1934. A. N. EMMONS 1,983,277

DISK SANDER

Filed Dec. 24, 1932 4 Sheets-Sheet 3

Fig-4-

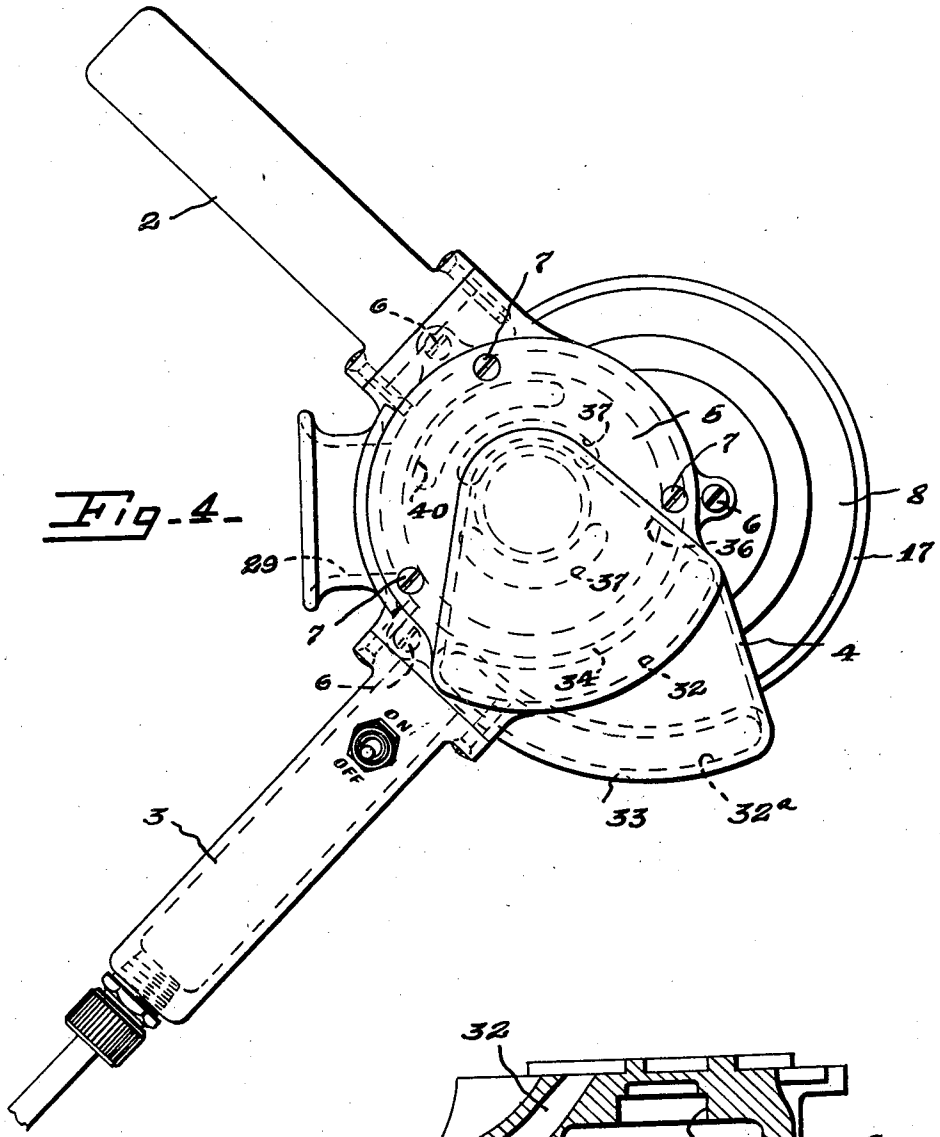
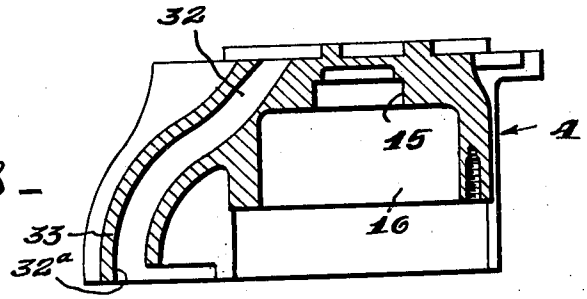


Fig-8-



INVENTOR.
Arthur N. Emmons
BY Bodell & Thompson
ATTORNEYS.

Dec. 4, 1934. A. N. EMMONS 1,983,277

DISK SANDER

Filed Dec. 24, 1932 4 Sheets-Sheet 4

Fig-6-

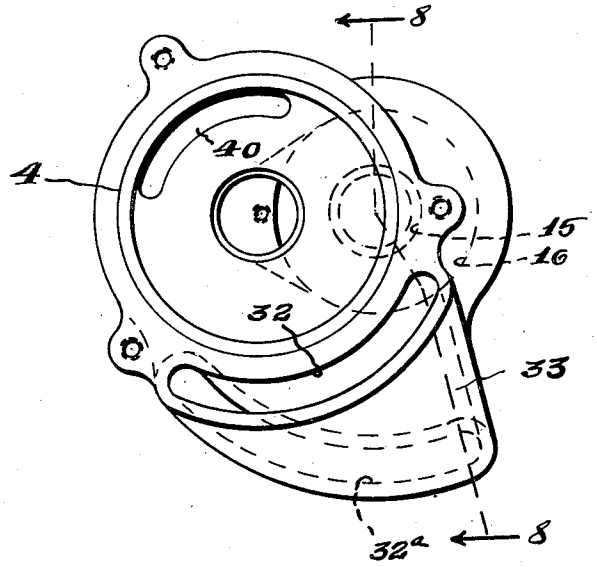
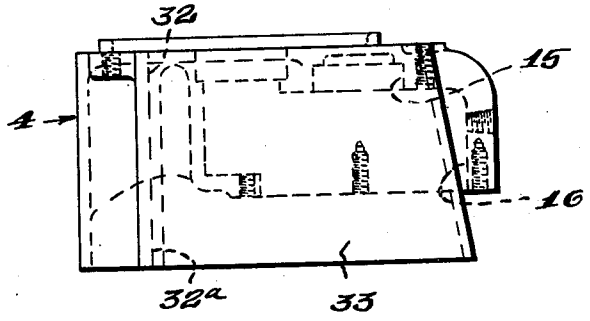


Fig-7-



INVENTOR.
Arthur N. Emmons
BY Bodell & Thompson
ATTORNEYS.

Patented Dec. 4, 1934 1,983,277

UNITED STATES PATENT OFFICE

1,983,277

DISK SANDER

Arthur N. Emmons, Syracuse, N. Y., assignor to The Porter-Cable Machine Company, Syracuse, N. Y., a corporation of New York

Application December 24, 1932, Serial No. 648,741

20 Claims. (Cl. 51—170)

This invention relates to abrading machines, and particularly so-called disk sanders, or abrading machines, having a rotary disk, on one face of which is provided a discoidal sheet of abrading material, as sandpaper and the like, and has for its object, a suction means for removing the dust created by the abrading disk in the operation of the machine, and a simple and compact arrangement of the fan which creates the suction air current and the inlet passage therefor, and the arrangement of the inlet end of said passage to the abrading disk.

It further has for its object a simple, compact and balanced arrangement of the motor, abrading disk, fan chamber and inlet for the fan chamber. It further has for its object, an arrangement of the fans for creating the suction for removing the dust, and for cooling the motor.

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.

Figure 1 is a side elevation of a disk sander embodying my invention.

Figure 2 is a sectional view on line 2—2, Figure 1.

Figure 3 is an inverted plan view looking upwardly in Figure 1.

Figure 4 is a plan view looking downwardly in Figure 1.

Figure 5 is a sectional view on line 5—5, Figure 1.

Figure 6 is a plan view of the casing, the cap being removed.

Figure 7 is an elevation of the base portion of the casing.

Figure 8 is a sectional view on line 8—8, Figure 6.

This sander comprises generally, a housing, or casing, a rotary abrading disk mounted in one end of the casing with its face exposed at said end and with its axis extending lengthwise of the casing, a motor mounted in the casing with its shaft extending lengthwise of the casing, the motor shaft being connected to the disk to rotate the same, and means operated by the motor for creating a suction air current to pick up the dust created by the disk. As the machine is usually used on horizontal surfaces, the casing is arranged in vertical position with the axes of the disk and the motor arranged vertically.

1 designates the barrel or body of the casing, which is cylindrical in general form, and provided with outwardly extending handles 2, 3, by means of which the machine is manipulated over the floor, and held during the operation thereof. The casing includes a base portion 4, and a top wall or cap 5, secured to the body, or barrel portion 1 of the casing in any suitable manner, as by screws 6 and 7 respectively. The disk 8 is mounted in the base 4, and is here shown as detachably mounted as by a threaded stud 9 in a spindle 10 journalled in upper and lower antifriction bearings 11 and 12, the bearing 11 being mounted in a recess 15 in the base portion 4, and the bearing 12 mounted in a bearing disk 14 suitably mounted in a recess 16 formed in the base portion 4. It will be understood that the disk 8 is provided on its lower face with a facing or disk of abrading material, as sandpaper 17.

18 designates the field coils of an electric motor, 19 the rotor, 20 the commutator, 21 the brushes coacting with the commutator, and suitably carried by the casing, and 22 the motor shaft, this extending lengthwise of the body of the casing centrally thereof, and being mounted in suitable bearings therein, the lower end of the motor shaft extending into the base 4 and connected through suitable motion transmitting means, or gearing 23 to the spindle 10. The spindle 10 is offset in one direction from the shaft 22 which, as before stated, is located centrally of the barrel, or intermediate body portion 1 of the casing.

25 and 26 are respectively upper and lower fan chambers formed in the upper part of the casing above the motor, the upper side of the chamber 25 being closed by the cap 5.

27 is a fan, or a rotor mounted on the upper end of the shaft 22 within the chamber 25. The chamber 25 has a laterally extending outlet 29 which discharges into a dust receptacle, or bag 30, and the chamber 26 discharges through peripheral outlets 31 into the outer air. The chamber 25 is provided with an inlet passage 36 formed in the casing, and the base, and extending lengthwise thereof, and opening through the lower end of the base adjacent the edge of the disk, this lower portion designated 32^a being located in a part 33 of the base 4 offset relatively to the shaft 22 of the motor in a direction opposite to the offset of the spindle 10. The lower, or entrance end, of the passage 36 is arcuate and arranged adjacent to the edge of the disk in position to pick up the dust created by

the disk. A wall 34 of an intermediate portion of this passage is in heat conducting relation to the field coils of the motor and forms a jacket or a cooling chamber 35, and this cooling chamber communicates through the passage 36 with the fan chamber 25, so that when the machine is in operation, an upward air current is created through the intake passage adjacent the disk 8, the passage or chamber 35, and through the passage 36 in the cap 5, into the fan chamber 25, thence out through the outlet 29, the dust being deposited in the receptacle 30, and the air in passing through the passage 35 in contact with the wall 34 cools the field coils of the motor.

The chamber 26 communicates, through passages 37, with the space in which the motor is located, and this space communicates at its lower end through an inlet passage communicating with the outer air, so that during the operation of the machine, the air is drawn through the motor and the air gap thereof, over the commutator, and into the fan chamber 26 whence it is discharged through the openings 31 to the outer air.

40 designates the inlet passage which communicates with the outer air above the disk, so that the air is drawn through the motor practically free of dust. In the use of the machine, the disk rotates in the direction of the arrow (Figure 3) which is an inverted view, thus tending to throw the dust created thereby into the lower end of the intake passage 32^a. The air intake passage 40 is located in a circumferential direction beyond, with respect to the direction of rotation of the disk, the intake end of the passage 32^a, and travel, or over-throw of the dust beyond the intake end of the passage 32^a is prevented by a baffle plate, or partition 41, separating the spaces from which the intake end of the passage 32^a and the intake passage 40 draw.

In use, the machine is operated as any disk sander, sometimes with the disk lying flat on the floor, and sometimes tilted slightly so that the advance edge portion of the disk bears on the floor, and in any case, the dust created by the disk is carried around to the intake end of the passage 32, and the dust laden air drawn through the passage 32 and discharged into the dust receptacle 30, cooling the field coils of the motor while passing through the passage 32. Air practically free of dust is drawn through the intake 40, and through the motor, or over the armature, commutator, and discharged through the outlets 31, the dust created by the disk being prevented from over-throwing into the space where it would otherwise be drawn into the intake 40 by the baffle plate, or partition 41.

This sander, provided with suction means for picking up the dust and for cooling the motor, is particularly simple, compact, and light in construction, and easy to manipulate.

What I claim is:

1. In a portable hand manipulated disk sander, of the type described, the combination of an upright casing, a rotatable abrading disk having its abrading face exposed at the lower end of the casing, a motor mounted in the casing and connected to the disk to rotate it, the disk being arranged relative to the lower end of the housing whereby a substantial cutting portion of the disk extends beyond one side of the housing, the casing being formed with a fan chamber having an outlet, and an inlet passage for said chamber having one end thereof arranged adjacent the housed edge of the disk, said inlet end of the passage extending beyond the edge of the disk and being arcuate to conform to the curvature of the edge of the disk and extending part way around the edge of the disk, and a fan mounted in the fan chamber and actuated by the motor.

2. In a portable hand manipulated disk sander of the type described, the combination of an upright casing, an abrading disk mounted in the lower end of the casing with its outer abrading face exposed at the lower end of the casing, the abrading disk having a substantial cutting portion extending beyond one side of the lower end of the housing, and a motor in the casing having its rotor connected to the disk to rotate the same, the casing having a fan chamber in the upper portion thereof formed with an outlet, and the casing being formed with an inlet passage for the fan extending lengthwise of the casing and opening through the lower end thereof adjacent the housed edge of the disk.

3. In a disk sander, the combination of an upright casing, an abrading disk mounted in the lower end of the casing with its outer abrading face exposed at the lower end of the casing, and a motor in the casing having its rotor connected to the disk to rotate the same, the abrading disk being partially housed by the lower end of the casing and a cutting portion of the disk extending beyond one side of the casing, the casing having a fan chamber in the upper end thereof formed with an outlet, and the casing being formed with an inlet for the fan extending lengthwise of the casing and opening through the lower end thereof adjacent the housed edge of the disk, the inlet end of said passage being arcuate and extending part way around the housed edge of the disk.

4. In a portable hand manipulated disk sander, of the type described, an upright casing, a rotary abrading disk mounted in the lower end of the casing with its face exposed at the lower end of the casing, a motor mounted in the casing with the axis of its shaft extending vertically, the shaft being connected to the disk to rotate the same, the casing being provided with a fan chamber at the upper end thereof, a fan in the fan chamber mounted on the motor shaft, and a heat conducting wall in heat conducting relation to the field coils of the motor, said wall being spaced apart from the inner walls of the housing forming a cooling passage, an inlet passage opening through the lower end of the casing adjacent the edge of the disk, and including said cooling passage, whereby the air current created by the fan picks up the dust created by the disk and passes through the cooling passage cooling the field coils.

5. In a portable hand manipulated disk sander of the type described, a casing; a rotary abrading disk mounted in the lower end of the casing with its face exposed at the lower end thereof, and a motor mounted in the casing with its shaft in vertical position, the shaft being connected to the disk to actuate the same, the casing being formed with fan chambers in the upper end thereof, one above the other, the fan chambers having separate inlet passages, the inlet passage for one fan chamber extending outside the field coils with one of its walls in heat conducting relation thereto, and the inlet for the other chamber communicating with the space in which the motor is located, and fans in

said chamber connected to the shaft to be actuated thereby.

6. In a portable hand manipulated disk sander of the type described, a casing, a rotary abrading disk mounted in the lower end of the casing with its face exposed at the lower end thereof, and a motor mounted in the casing with its shaft in vertical position, the shaft being connected to the disk to actuate the same, the casing being formed with fan chambers in the upper end thereof, one above the other and fans in the chambers connected to the shaft to be actuated thereby, the fan chambers having separate inlet passages, the inlet passage for one fan chamber extending outside the field coils and having a wall in heat conducting relation to the field coils, and the inlet for the other fan chamber communicating with the space in which the motor is located, the inlet for the first fan chamber opening through the lower end of the casing adjacent the edge of the disk.

7. In a portable hand manipulated disk sander of the type described, a casing, a rotary abrading disk mounted in the lower end of the casing with its face exposed at the lower end thereof, a motor mounted in the casing with its shaft in vertical position, the shaft being connected to the disk to actuate the same, the casing being formed with fan chambers in the upper end thereof, one above the other and fans in said chamber connected to the shaft to be actuated thereby, the fan chambers having separate inlet passages, the inlet passage for one fan chamber extending outside the field coils of the motor and having a wall in heat conducting relation thereto, and the inlet for the other fan chamber communicating with the space in which the motor is located, the inlet passage for the first fan chamber opening through the lower end of the casing adjacent the edge of the disk, and being arcuate and conforming to the curvature of the edge of the disk.

8. In a portable hand manipulated disk sander of the type described, an upright casing having a top wall, an abrading disk mounted in the lower portion of the casing with its face exposed at the lower end of the casing, a motor mounted in the casing with its shaft extending vertically and located centrally of the casing, the abrading disk being arranged with its axis offset relatively to the shaft, motion transmitting means between the shaft and the disk, the casing being also formed with fan chambers arranged one above the other in its upper end above the motor, and fans in said chambers mounted on the motor shaft, the upper chamber having a central intake in its upper side, an inlet for one fan chamber and extending lengthwise of the casing and having its lower portion offset relatively to the axis of the motor in a direction opposite to the offset of the disk, and opening through the lower end of the casing adjacent the edge of the disk, an intermediate portion of said passage having a wall in heat conducting relation to the field coils of the motor and an upper portion of said passage being formed in the top wall of the casing and communicating with said intake, and an inlet passage for the other fan chamber opening into the space in which the motor is located.

9. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section detachably secured to the lower end of the body section, a motor arranged in the body section, an abrading disk journalled in the lower end section, suction means arranged in the body section and having an inlet passage extending into the lower end section, and having an opening adjacent the edge of the abrading disk, and motion transmitting means operatively connecting the motor shaft and the abrading disk.

10. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section detachably secured to the lower end of the body section, a motor arranged in the body section, an abrading disk journalled in the lower end section, suction means arranged in the body and operated by the motor and having an inlet passage extending into the lower end section with an opening adjacent the edge of the abrading disk, said suction means having an outlet provided with a dust collecting means, and motion transmitting means operatively connecting the motor shaft and the abrading disk.

11. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section detachably secured to the lower end of the body section, a motor arranged in the body section, and an abrading disk journalled in the lower end section and partially housed thereby, and having a segmental cutting portion extending beyond one side wall of said lower end section, suction means arranged in one of said sections and having an inlet passage extending into the lower end section and having an opening adjacent the housed edge of the abrading disk, and motion transmitting means operatively connecting the motor shaft and the abrading disk.

12. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing, said casing including a body section, an end section detachably secured to the lower end of the body section, a motor mounted in the body section, and an abrading disk journalled in the lower end section and being partially housed thereby and having a segmental cutting portion extending beyond the side wall of said end section, suction means arranged in the body section and having an inlet passage extending into the lower end section with an opening adjacent the housed edge of the abrading disk, motion transmitting means operatively connecting the motor shaft and the abrading disk, said means being arranged in the lower end section and housed separately from the intake opening of the suction means.

13. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section secured to the lower end of the body section, a motor mounted in the body section and having its rotor shaft extending into the lower end section, a rotary abrading disk journalled in the lower end section, said end section having a depending arcuate portion, suction means arranged in the body section and having an inlet passage extending into the lower end section and having an opening in the depending arcuate portion of the end section adjacent the edge of the abrading disk, gearing arranged in the lower end section and operatively connecting the rotor shaft and the abrading disk, said gearing being housed sepa-

rately from the intake passage of the suction means.

14. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section secured to the lower end of the body section, a motor mounted in the body section with a shaft extending into the lower end section, a pair of handles extending outwardly from one side of the body section and arranged in spaced apart relationship, an abrading disk rotatably mounted in said lower end section on an axis arranged at one side of the axis of the motor whereby the abrading disk extends outwardly beyond the side of the casing opposite to the handles, motion transmitting means arranged in the lower end section and operatively connecting the motor shaft and the abrading disk, suction means arranged in the body section and having a dust collecting duct extending into the lower end section and having an opening adjacent the edge of the abrading disk, and an outlet extending between and above the handles, said motion transmitting means being housed in the lower end section separately from the suction duct.

15. In a disk sander, the combination of an upright casing, a motor mounted in the casing on an upright axis, an abrading disk rotatably mounted on an upright axis in the lower end of the casing and operatively connected to the shaft to be actuated thereby, said casing consisting of an intermediate body section enclosing the motor, a lower section in which the disk is rotatably supported, and an upper section formed with a fan chamber, a suction conduit leading from the lower section from a point adjacent an edge of the disk, and communicating with the fan chamber, said fan chamber having an outlet opening provided with dust collecting means.

16. In a disk sander, the combination of an upright casing, a motor mounted in the casing on an upright axis, an abrading disk rotatably mounted on an upright axis in the lower end of the casing and operatively connected to the shaft to be actuated thereby, said casing consisting of an intermediate body section enclosing the motor, a lower section in which the disk is supported, and an upper section formed with a fan chamber, the motor shaft being mounted in bearings in the intermediate and lower sections, a suction conduit leading from the lower section from a point adjacent an edge of the disk, and communicating with the fan chamber, said fan chamber having an outlet, the disk being mounted with its axis offset from the axis of the motor shaft, and a segmental exposed edge portion extending outside of the lower section, said exposed edge portion being located on the opposite side of the axis of the disk from that housed within the lower section and from which the suction conduit leads.

17. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section detachably secured to the lower end of the body section, the body section being formed at its upper end with a fan chamber, a motor mounted in the body section and having one end of its shaft extending into the fan chamber, and the other end extending into the lower end section, a fan mounted upon said shaft in the fan chamber, and an abrading disk rotatably mounted in the lower end section, a suction duct extending lengthwise of the body section and having one wall in heat conducting relationship to the motor, the inlet end of said duct opening in the lower end section adjacent the edge of the abrading disk, and the upper end of said duct opening into the fan chamber, said fan chamber having an outlet opening provided with a dust collecting means, and motion transmitting means arranged in the lower end section and operatively connecting the motor shaft and the abrading disk.

18. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing, a rotatable abrading disk arranged in the lower portion of the casing with the face of the disk exposed at the lower end of the casing and having a substantial cutting portion extending beyond the side of the casing, a motor mounted in the casing and connected with the disk to rotate it, a fan chamber arranged in the casing, said chamber having an outlet and also having an inlet passage with one end thereof arranged adjacent the housed edge of the disk, said inlet end of the passage extending beyond the edge of the disk and part way around the edge of the disk and a fan mounted in the fan chamber and actuated by the motor.

19. In a portable hand manipulated disk sanding machine of the type described, the combination of an upright casing including a body section and an end section detachably secured to the lower end of the body section, a motor arranged in the body section, an abrading disk journalled in the lower end section, suction means arranged in one of said sections and having an inlet opening adjacent the edge of the abrading disk, and motion transmitting means operatively connecting the motor shaft and the abrading disk, said means being arranged in the casing and housed separately from the inlet opening of the suction means.

20. In a portable hand manipulated disk sanding machine, the combination of a casing, an abrading disk rotatably journalled in the casing and partially housed thereby with its abrading face exposed through the casing to act upon the surface being finished, a motor mounted in the casing, said casing being provided with means for collecting dust created by the action of the abrading disk including a fan chamber having an outlet, and also having an inlet passage with the inlet end thereof communicating with the disk housing portion of the casing, a fan arranged in said fan chamber and operatively connected to the motor, and motion transmitting means connecting the motor shaft and the abrading disk, said motion transmitting means being housed separate from the intake passage of the dust collecting means.

ARTHUR N. EMMONS.