Dec. 18, 1956 A. N. EMMONS 2,774,198

PORTABLE BELT SANDING MACHINE

Filed April 5, 1955 3 Sheets-Sheet 1

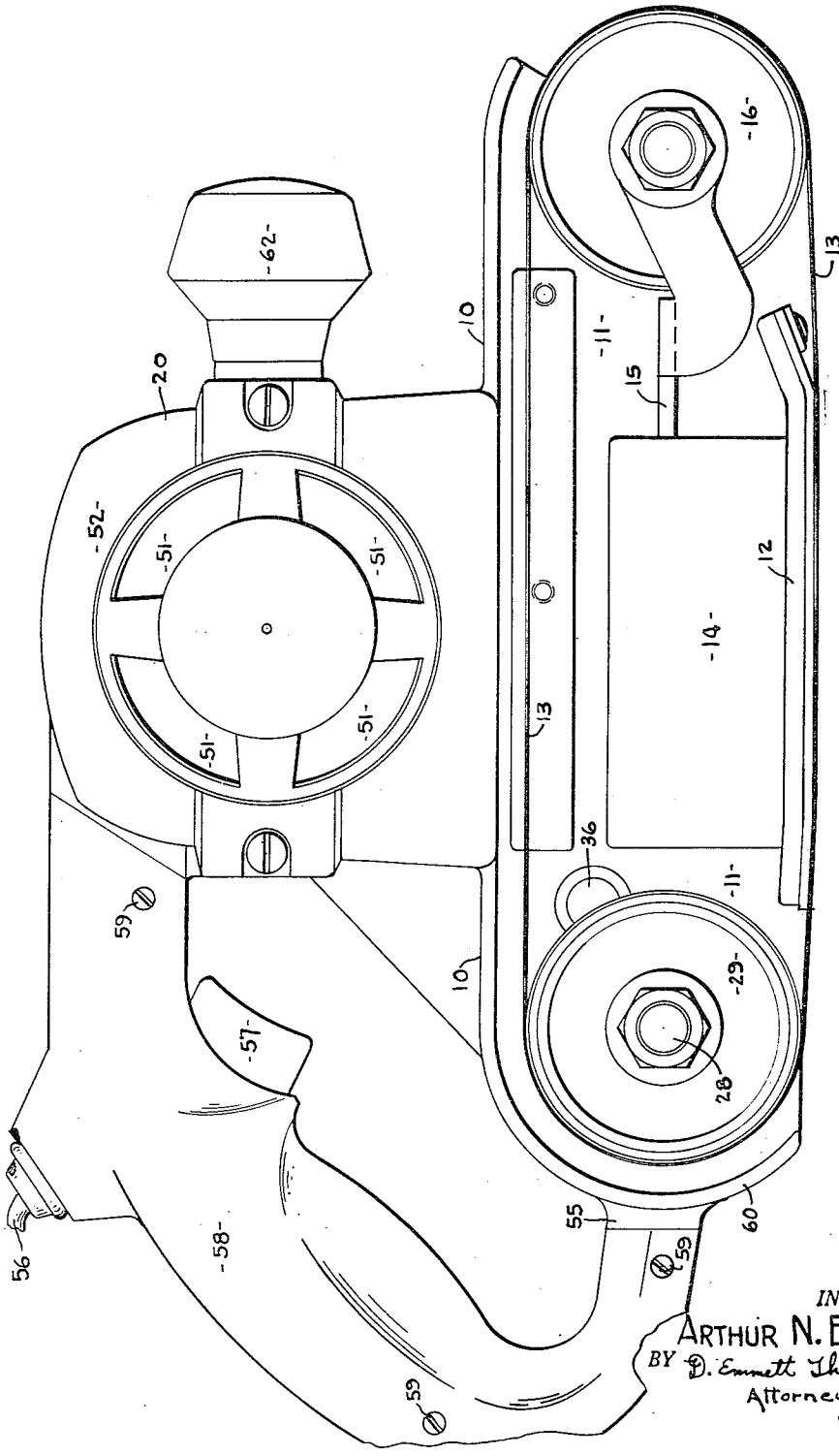


Fig. 1

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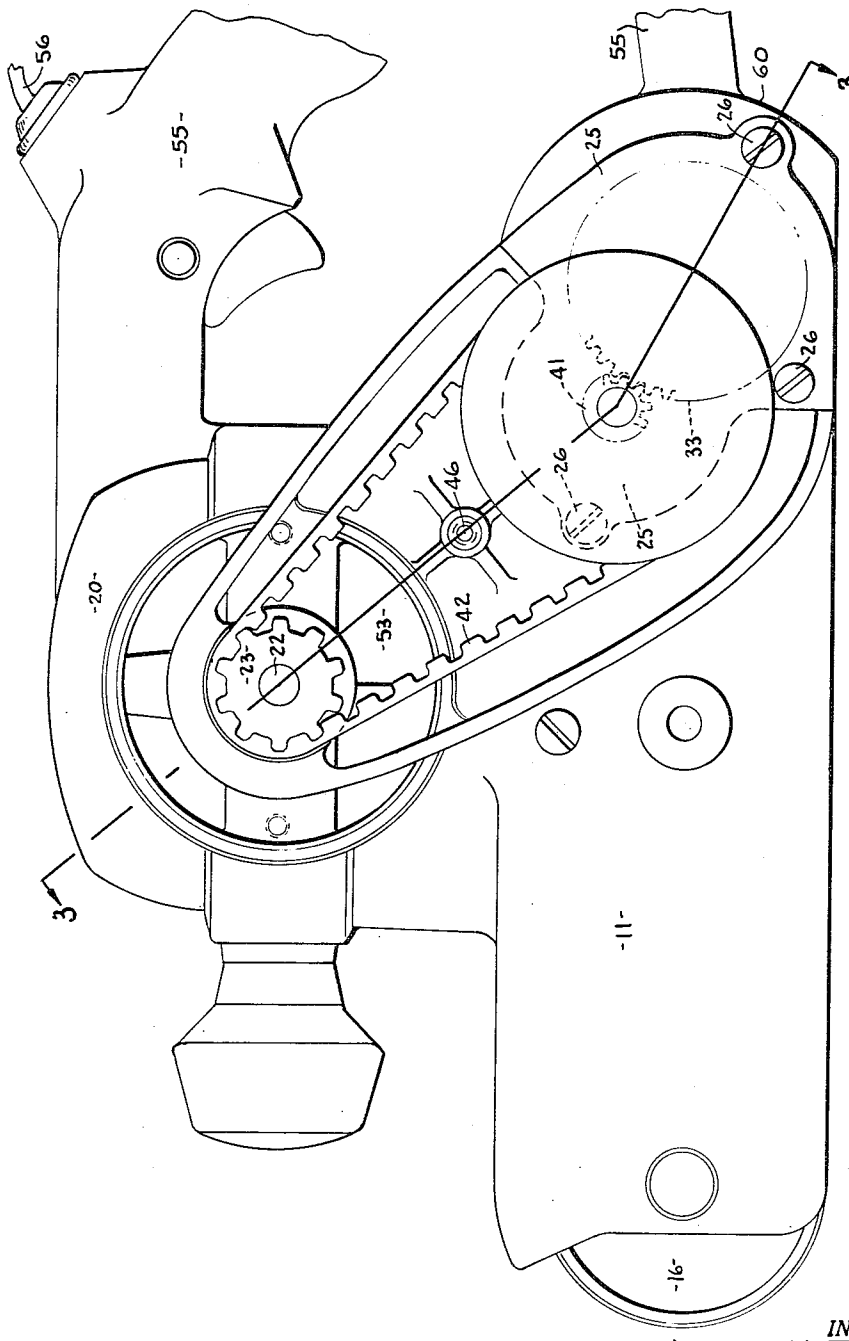


FIG. 2

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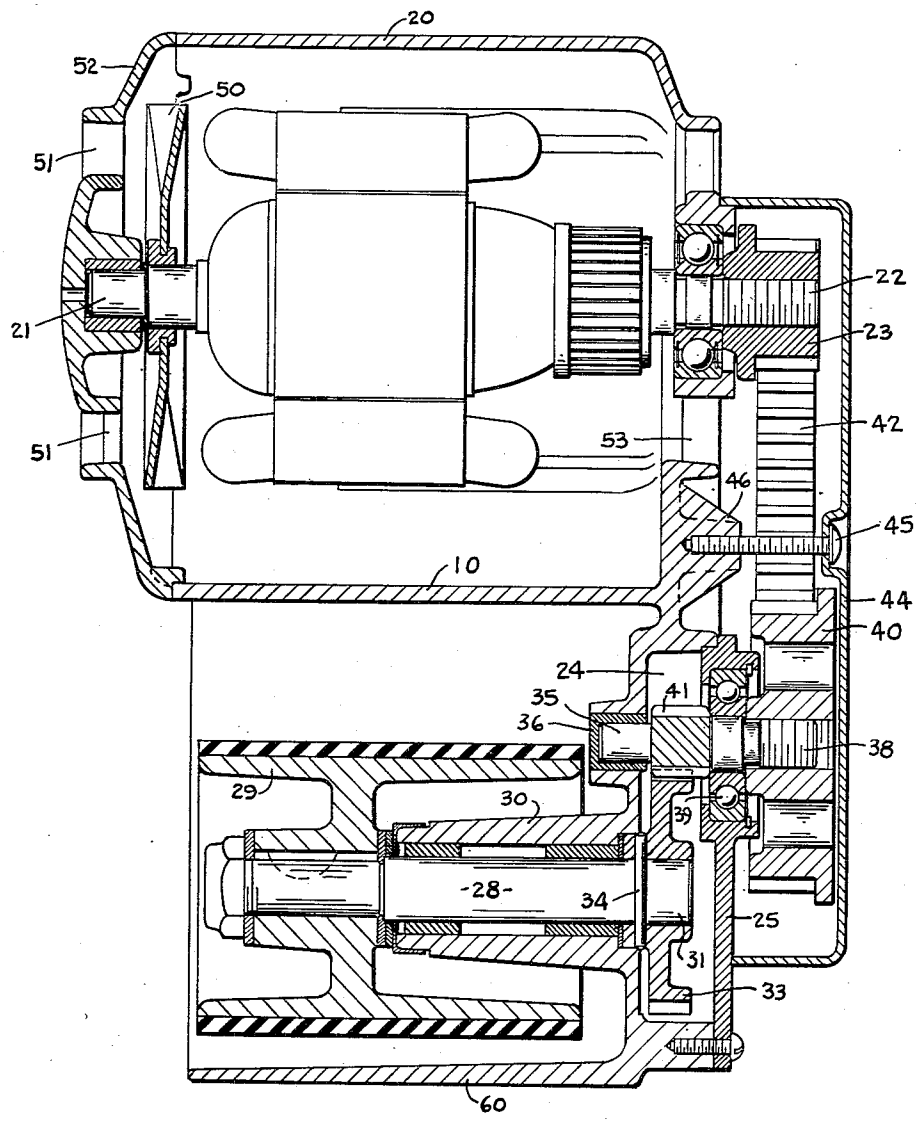


Fig. 3

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PORTABLE BELT SANDING MACHINE

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Application April 5, 1955, Serial No. 499,381

3 Claims. (Cl. 51—170)

This invention relates to portable self-contained, power-operated, belt sanding machines.

These machines consist generally of a frame in which the driving and idler rolls are journalled, and in, or on which, an electric motor is mounted and which is operatively connected to the driving roll to effect rotation thereof for movement of the endless abrasive belt trained over the driving and idler rolls. This type of sanding machine is used very extensively and functions to efficiently and rapidly remove large amounts of material, preparatory to rendering the surface of the work ready for the application of a finish.

This invention has as an object a belt sanding machine embodying a structural arrangement which is particularly economical to manufacture, which operates more efficiently and with less power consumption and requires less maintenance.

The invention has as a further object a drive mechanism between the motor and the driving roll, which mechanism functions to transmit the power from the motor without any slippage and/or generation of heat, and with a minimum of friction loss.

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 drawing in which like characters designate corresponding parts in all the views.

In the drawings—

Figure 1 is a side elevational view of a sanding machine embodying my invention, the view looking to the right relative to Figure 3.

Figure 2 is a side elevational view of the machine looking to the left, Figure 3.

Figure 3 is a sectional view taken on a line corresponding to line 3—3, Figure 2.

The sanding machine consists of an integral cast metallic frame structure having a flat top wall **10** from one side edge of which a vertically disposed side wall **11** depends. In its central portion, the frame member is substantially U-shaped, having a bottom wall **12** extending in spaced parallel relation to the top wall **10**, this bottom wall forming a shoe over which the lower run of the abrasive belt **13** travels in a rearward direction, or to the left, Figure 1. The frame is provided with a structure at **14** for supporting a yoke **15** in which the idler roll **16** is journalled, this roll being positioned at the forward end of the frame structure. The yoke and its supporting structure is more particularly described in the co-pending application of Lars Frostad, Ser. No. 437,687, filed June 18, 1954, now Patent No. 2,742,741, dated April 24, 1956. A motor housing **20** is arranged on the top wall **10** and preferably, as here shown, is cast integral therewith and in which the driving motor is mounted with its armature shaft **21** extending transversely of the frame and having an end portion **22** extending outwardly beyond the plane of the side wall **11**. A belt pulley **23** is fixedly secured to this extending portion **22** of the armature shaft as being threaded thereon, see Figure 3.

The side wall **11** is formed, at the rear end of the frame structure, with a recess **24** provided with a closure cap **25** affixed thereto as by screws **26**. A shaft **28** is journalled in the side wall **11** and has affixed to its inner end the driving roll **29**. Adequate support for the shaft **28** is provided by an inwardly extending boss **30** cast integral with the side wall. The shaft **28** has an end portion **31** extending into the gear compartment **24** and provided with a spur gear **33** affixed to the shaft as by a pin **34**.

The recess **24** forms a gear compartment in which a reduction gearing of the drive structure is mounted. A jack shaft **35** is mounted in the gear compartment **24**, the inner end of the shaft being journalled in a bushing **36**. The shaft **35** has a portion **38** extending outwardly through an anti-friction bearing **39** mounted in the compartment closure **24**. A belt pulley **40** is fixedly mounted on the outer portion **38** of the jack shaft, as by being threaded thereon, and the jack shaft is formed intermediate its ends with a pinion gear **41** which is arranged in mesh with the gear **33**.

The pulleys **23**, **40**, are arranged in alignment and are preferably of the gear tooth type to accommodate a cog belt **42**. The pulley **40** is of substantially greater diameter than the pulley **23** to effect proper speed reduction from the high speed armature shaft **21**. Also, the gear **33** is of substantially greater diameter than the pinion **41**, effecting a further speed reduction and providing the necessary high torque to effect operation of the belt **13**. The pulleys **23**, **40** and the belt **42** are arranged in a compartment formed by a closure or cover member **44** detachably secured to the frame, as by screw **45**, threaded into a boss **46**.

The armature shaft is provided with a fan **50**, which functions to draw air inwardly through openings **51** formed in the end cap **52** of motor housing **20**, about the motor components, and discharging an air blast through openings in the opposite end wall of the housing **20**. One of these latter openings, as opening **53**, communicates with the belt compartment. This arrangement effects cooling of the belt **42**, and further maintains a slight air pressure within the enclosure, thereby preventing the entrance of abrasive dust in the enclosure. Heretofore, belt drives on sanders of this type have not been economical because of the abrasion of the dust between the pulleys and the belt.

With this arrangement, the cog belt provides a reduction drive from the motor to the jack shaft, without slippage and without requiring the application of a lubricant. The high torque transmitting portion of the drive is through the gear reduction **33**, **36**, which is confined within the gear compartment **24** and which is lubricant tight whereby the lubricant does not drip out on the work being finished by the sander.

Due to the fact that there is no slippage between the pulley **23** and the cog belt **42**, no heat is generated by friction at the pulley. Due to the cooling effect of the fan **50**, no heat is generated by the flexing of the belt as it travels about the small pulley **23** of the high speed universal motor. This effects a lower operating temperature of the motor and housing **20** and in turn permits the machine being provided with a metallic handle **55** cast integral with the frame. The power supply cable **56** enters through the top portion of the handle and is connected to the windings of the motor through a switch positioned in the handle and actuated by a trigger **57**. The handle is provided with a removable side plate **58** attached, as by screws **59**, to the handle proper. The upper portion of the handle is formed integral with the motor housing **20** and the lower portion formed integral with a curved wall **60** curving downwardly from the top

wall 10, in spaced concentric relation to the rear pulley 29. A handle knob 62 is attached to the forward side of the motor housing 20 for the convenient manipulation of the machine.

What I claim is:

1. A power operated, bodily manipulable belt sanding machine comprising a frame having a top wall, a vertically disposed side wall depending from a side edge of the top wall, a motor housing on the top wall, a motor mounted in the housing and having its power shaft extending transversely of said top wall and having an end portion projecting outwardly from the plane of the side wall, a belt pulley fixed to said end portion of the motor shaft, said side wall being formed with a recess in its outer surface in proximity to the rear end of the frame to provide a gear compartment, an idler roll journalled at the forward end of the frame, a shaft journalled in the rear end portion of said side wall and extending transversely below said top wall, a driving roll fixed to the inner end of said shaft, the outer end of said shaft extending into said recess, a closure for said recess forming in conjunction therewith a grease tight gear compartment, a jack shaft journalled in said gear compartment and having an end portion extending outwardly through said closure, gearing arranged in said gear compartment and operatively connecting said jack shaft to said driving roll shaft, a pulley fixed to the extending portion of said jack shaft, the periphery of said pulleys being formed with cogs, and a cog belt trained over said pulleys.

2. A portable self-contained power-operated belt sander comprising a frame including a top wall, a side wall depending from one longitudinal edge of the top wall, a motor housing on said top wall, said side wall being recessed at the rear portion thereof to form a gear compartment, a shaft journalled in said side wall and having an end portion extending transversely below the top wall, an abrasive belt driving roll mounted on said end portion of the shaft, the opposite end of said shaft extending into said gear compartment, a jack shaft journalled in said gear compartment, gearing arranged in said compartment operatively connecting said first-mentioned shaft and said jack shaft, said jack shaft having an end portion extending exteriorly of the plane of said side wall, a motor mounted in said motor housing and having a power shaft extending outwardly from the plane of said side wall, a cog belt drive arranged exteriorly of said side wall and operatively connecting said motor shaft to said jack shaft, a closure member detachably secured to the frame and forming a compartment for said belt drive, said motor housing being formed with an aperture communicating with said belt compartment, a fan mounted on said motor shaft in said motor housing and being operable to circulate an air current through said belt compartment, an idler roll journalled at the forward end of the frame and an abrasive belt trained over said rolls for movement lengthwise of the frame below said top wall.

3. A power operated, bodily manipulable, belt sanding machine comprising an integral frame having a top wall, a vertically disposed side wall depending from a longitudinal side edge of the top wall, and a motor housing extending transversely of the top wall at substantially the mid point thereof, a motor mounted in said housing and having an end portion of its power shaft projecting outwardly from the plane of said side wall, said side wall being formed with a recess in proximity to the rear end of the frame to provide a gear compartment, a closure member overlying said recess and being detachably secured to said side wall and forming, in conjunction with said recesses, a grease tight gear compartment, a jack shaft journalled in said gear compartment and having an end portion extending through said closure externally of the plane of said side wall, belt pulleys fixedly secured to said extending ends of the motor shaft and jack shaft respectively, a drive belt trained over said pulleys, a cover member detachably secured to the frame and forming an enclosed compartment for said pulleys and belt, a drive roll shaft journalled in said side wall at the rear end thereof, said shaft extending transversely of the frame below the top wall thereof and having an end portion extending into said gear compartment, an abrasive belt driving roll mounted on said shaft, reduction gearing arranged in said gear compartment and operatively connecting said jack shaft and said drive roll shaft, an idler roll journalled at the forward end of the frame, and an abrasive belt trained over said rolls for movement lengthwise of the frame below said top wall.

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