ABSTRACT: A power-sanding device has a housing rotatably supporting an elongate drive shaft extending therefrom and rotatably supporting driven shaft portions extending from opposed ends and having a sanding drum mounted on the extending ends thereof. Power means operatively engages the drive shaft to rotate the sanding drums through intermeshing gears on the drive and driven shafts. An elongate arm extends from the housing and has a gripping portion on one end thereof and a guard member mounted on the housing between the gripping portion and a portion of the sanding drums.
PoweR-Sanding DeviCe

The present invention relates to sanding devices and more particularly to sanding attachments for power tools.

The principal objects of the present invention are: to provide a power-sanding device in the form of a power device wherein the sanding device is particularly adapted for sanding curved surfaces, such as boat hulls, vehicle bodies, and the like; to provide such a power-sanding device which is in the form of an attachment for power tools and is easy to guide and does not rotate around a drive shaft when in use; to provide such a power-sanding device having means for substantially preventing slippage between a periphery of a sanding drum and an abrasive sleeve mounted thereon; to provide such a power-sanding device having a pair of sanding drums spaced on opposite sides of a housing with the drums rotating in the same direction; and to provide such a power-sanding device which is economical to manufacture, efficient and durable in use, easily maintained, and particularly adapted for the use intended.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a perspective view of a sanding device embodying features of the present invention.

FIG. 2 is a plan view of the sanding device.

FIG. 3 is an Elevation view of the sanding device.

FIG. 4 is a transverse sectional view through the sanding device taken on line 4-4, FIG. 3 showing gears for rotating the drums.

Referring more in detail to the drawings:

The reference numeral 1 generally designates a power-sanding device arranged to be driven by a power tool or motor 2. In the illustrated structure, the motor 2 is in the form of a power drill and the sanding device 1 is in the form of an attachment for the power tool or drill 2. In the illustrated structure the sanding device 1 has an elongate housing 3 30 rotatably supporting an elongate drive shaft 4 extending therefrom and the housing 3 having an elongate housing 3 having sanding drums 6 and 7 mounted on opposite end portions thereof. The motor on power tool 2 is operatively connected to the drive shaft 4 to rotate the sanding drums 6 and 7 through a gear transmission 9 which in the illustrated structure consists of bevel gears 10 and 11 on the drive and driven shafts 4 and 5 respectively. An elongate arm 12 extends from the housing 3 and has a gripping portion or handle 13 on a free end thereof and a guard member 14 is mounted on the housing 3 and is positioned between the gripping portion 13 and a portion of each of the sanding drums 6 and 7.

The gear transmission 9 is contained within a gear chamber 15 within the housing 3. It is, therefore, necessary to provide access to the gear chamber 15 to install or replace the gears 10 and 11 therein. In the illustrated structure, the housing 3 is a split housing having sections 16 and 17 with one of the sections, as for example section 17, having a guide shoulder 18 thereon and the other section 16 having a mating surface 19 adapted to slidely engage the guide shoulder 18 whereby the housing sections 16 and 17 telescope together in mating engagement. The sections 16 and 17 are suitably secured together, as by a plurality of machine bolts 20, to close the gear chamber 15 after the gears 10 and 11 are mounted on the drive and driven shafts 4 and 5. In the illustrated structure, the machine bolts 20 are each received in an elongate bore 21 in one of the housing sections, as for example section 17, and threadedly engage a threaded bore 22 in the other housing section 16.

It is preferable that heads of the machine bolts 20 be flush with an exterior surface of the housing section 17, therefore, counterbores 23 are formed in the exterior surface of the housing section 17 at the exterior surface end of the bore 21 to receive a head portion of respective machine bolts 20.

The housing sections 16 and 17 have elongate alignable bores 24 and 25 respectively, each positioned to receive and rotatably support portions of the driven shaft 5, as later described. The bores 24 and 25 communicate with the gear chamber 15 having the bevel gears 10 and 11 therein, and each has suitable means therein to rotatably support the respective portions of the driven shaft 5, such as antifriction ball bearings, tapered rollers, bushings, and the like.

In the illustrated structure, the bevel gear 11 is suitably fixed, keyed, or pinned on an intermediate portion of the driven shaft 5, as by an elongate taper pin 26, and is positioned on the drive shaft 5 to engage the flanges of a flanged bushing 27 positioned in the bore 25 in the housing section 17. A sleeve bushing 28 is positioned in the bore 24 in the housing section 16 to cooperate with the flanged bushing 27 to rotatably support portions of the driven shaft 5. Seals 29 are mounted in counterbores 30 and 31 at the exterior surface end of the bores 24 and 25 in the housing sections 16 and 17 respectively. Thrust washers 32 are sleeved on the driven shaft 5 and engage the seals 29 and the exterior surface of the housing sections 16 and 17 adjacent the counterbores 30 and 31 to space the sanding drums 6 and 7 from the opposite ends of the housing 3 and to provide suitable bearing therebetween.

The drive means, in the form of the power tool 2, is operatively connected to a free end of the drive shaft 4 and in the illustrated embodiment of the present invention, the drive shaft 4 is transverse to the driven shaft 5 and it is necessary to guide and rotatably support the drive shaft 4, therefore, an upper portion of the housing 3 has a threaded bore 33 intermediate the ends thereof and is adapted to receive a threaded portion 34 of an elongate shaft guide member 35 having the drive shaft 4 rotatably supported therein. The shaft guide member 35 has an elongate internal bore 36 having suitable means therein to guide and rotatably support the drive shaft 4, such as antifriction ball bearings, tapered rollers, bushings and the like. In the illustrated structure, counterbores 37 and 38 are formed at opposite ends of the shaft guide member 35 to seat a flange portion 39 of flanged bushings 39 and 40 respectively which are mounted in the bore 36 to receive and support the drive shaft 4. One of the counterbores, as for example counterbore 37, is in the threaded end portion 34 and is sized to receive a portion of the bevel gear 10 which is suitably fixed, keyed or pinned on the drive shaft 4, as by an elongate taper pin 41, at the other end thereof. A collar 42 is sleeved on the drive shaft 4 and is suitably secured thereon intermediate the ends thereof as by an elongate taper pin 43, in a position to engage a portion of the flanged bushing 40 seated in the other counterbore 38, to thereby guide the drive shaft 4 and maintain same within the shaft guide member 35 during rotation thereof.

It is desirable to space the gripping portion or handle 13 from the exterior surface of the sanding drums 6 and 7 to prevent injury to a person (not shown) using the sanding device 1. In the illustrated structure the shaft guide member 35 has a shoulder 44 on the exterior surface thereof adjacent the threaded end portion 34 to receive and support a handle assembly 45. An elongate split sleeve portion 46 of the handle assembly 45 is removably mounted on the exterior surface of the shaft guide member 35 and one end thereof engages or seats on the shoulder 44. The arm 12 is part of the handle assembly 45 and is illustrated as a pair of bars 47 and 48 extending radially from the split sleeve portion 46 and has the gripping or handle portion 13 mounted on the free ends thereof. The bars 47 and 48 are transversely spaced and suitably secured to the split sleeve portion 46 on adjacent sides of a split or slot 49 extending between opposite ends thereof whereby a suitable extension device, such as a machine bolt or screw 50 which is mounted in the bars 47 and 48 in a manner similar to the machine bolts 20 thereby being adapted to tighten the split sleeve portion 46 into clamping engagement with the exterior surface of the shaft guide member 35.

The guard member 14 is positioned between the handle 13 and the sanding drums 6 and 7 and the guard member 14 is
formed of a pair of sections 51 and 52 suitably secured to the split sleeve portion 46 adjacent the split or slot 49 therein, as by welding, and extends therefrom and the guard sections are of a suitable arcuate shape to cover a portion of the sanding drums 6 and 7 respectively to protect the hand (not shown) of a person (not shown) gripping or holding the handle portion 13 of the sanding device 1.

The guard member 14 is sized to cover only a small portion of the sanding drums 6 and 7 whereby the power-sanding device is particularly maneuverable to engage curving surfaces, such as boat hulls.

It is desirable that the power-sanding device 1 be a compact structure and that the sanding drums 6 and 7 be as close together as reasonably possible so that the sanding effort can be concentrated in a desired area of a surface being treated. Therefore, the sanding drums are tubular members adapted to be in an overlying and surrounding relation with end portions of the elongate housing 3.

In the illustrated structure, the sanding drums 6 and 7 are each formed of an elongate drum or core portion 53 having a hub portion 54 centered therein and suitably fixed, keyed or pinned on the respective end portions of the driven shaft 5, as by an elongate pin 55. The core portion 53 is illustrated as an elongate tubular cylindrical member having a recess or opening in each end thereof of which tapers from the opposite ends toward the hub portion 54 thereby being adapted to be positioned in a covering and surrounding relation with tapered end portions 56 of the respective housing sections 16 and 17.

It is preferable to have the periphery of the sanding drums 6 and 7 formed of a resilient material, such as soft rubber, neoprene or the like, and to have the mounting portion or hub portion 54 formed of a relatively rigid material, such as hard rubber, metal or the like. In the illustrated structure, the core portion 53 is a separate member, preferably of metal, and the exterior surface of the core portion 53 is preferably left in a roughened condition or roughened after forming whereby a resilient rim 57, preferably of rubber, may be bonded thereto. The resilient rim 57 has a plurality of circumferentially spaced cuts 58 extending longitudinally along the periphery thereof.

The cuts 58 are each inclined relative to a radial plane 59 through a root 60 of each of the cuts 58 with the incline being outwardly from the plane 59 toward the direction of operation of the drums 6 and 7 and the incline is in the nature of 10° to 30° from the plane 59 whereby the diameter of the resilient rim 57 may be reduced by grasping the periphery thereof while at rest and twisting same toward the direction of operational rotation which is in the same direction as the incline of the cuts 58. The resilient rim 57 is thereby prepared to receive an elongate generally cylindrical sleeve member 61 having an abrasive exterior surface, such as sandpaper. The incline of the cuts 58 is also such that during operational rotation of the sanding drums 6 and 7, as indicated by arrow 62, the periphery of the resilient rim 57 will increase or be extended or enlarged to provide a firm engagement with the interior surface of the sleeve member 61 substantially preventing slippage therebetween to thereby maintain the abrasive sleeve 61 on the resilient rim 57 during use of the sanding device 1.

In use, the bevel gears 10 and 11 are mounted on the drive and driven shafts 4 and 5 by the taper pins 41 and 26 respectively. The sleeve bushing 28 is positioned in the bore 24 and the flanged bushing 27 is positioned in the bore 25. The housing sections 16 and 17 are sleeved on opposite ends of the driven shafts and there are secured together by the machine bolts 20. The hub portions 54 are secured to the opposite end portions of the driven shaft 5 by the pins 55. The periphery of each resilient rim 57 is grasped and twisted in the direction of rotational operation, as indicated by arrow 62, to reduce the diameter thereof to receive the sleeve member 61 therein.

The flanged bushings 39 and 40 are seated in the counterbored 37 and 38 of the bore 36 and the drive shaft 4 is inserted through the bushings 39 and 40 in the guide member 35 which is then mounted in the threaded bore 33 with the bevel gears 10 and 11 in intermeshing engagement. The handle assembly 45 is then mounted on the guide member 35 and a chuck 63 of the power tool 2 is operatively connected to the free end of the drive shaft 4 to rotate the sanding drums 6 and 7. The power tool 2 and the handle 13 are grasped or held by a person (not shown) to guide the sand device 1 during use.

With the sanding drums 6 and 7 being mounted on opposite ends of the driven shaft 5, they both rotate in the same direction and at the same speed whereby the sanding device 1 does not rotate around the drive shaft 4 when the sanding drums 6 and 7 are both in engagement with a surface (not shown) being sanded or treated.

The sanding device 1 is also adapted to be used as a polisher by placing a sleeve member having an exterior buffing surface of soft material, such as cloth, on the resilient rim 57 of each drum 6 and 7.

It is to be understood that while I have illustrated and described one form of my invention it is not to be limited to this specific form or arrangement of parts herein described and shown.

What we claim and desire to secure by Letters Patent is:

1. A power-sanding device comprising:
   a. a housing having an elongate drive shaft rotatably supported therein;
   b. an elongate driven shaft rotatably supported in said housing, said driven shaft having opposite ends thereof extending from said housing transversely to said drive shaft;
   c. said housing including a pair of elongate end sections each having a bore through one end thereof, said bores being alignable to rotatably support said driven shaft, said end sections each having mating means on the other ends thereof for aligning said bores;
   d. means for securing said end sections together with said bores aligned;
   e. a threaded bore in said housing disposed transverse to said driven shaft;
   f. an elongate drive shaft guide member having one end threaded for mounting in said threaded bore, said guide member having said drive shaft rotatably supported therein;
   g. an elongate arm extending from said housing;
   h. a gripping portion on one end of said arm for guiding the sanding device;
   i. gears within said housing operatively connecting said drive and driven shafts;
   j. an elongate sanding drum mounted on each end of said drive shaft;
   k. power means operatively connected to said drive shaft to rotate same and said sanding drums.

2. The power sanding device as set forth in claim 1 including:
   a. a split sleeve mounted on said guide member and having said arm extending therefrom; and
   b. a split guard member on said split sleeve, said guard member being positioned between said gripping portion and a portion of each of said sanding drums.

3. A power-sanding device comprising:
   a. an elongate housing having a pair of elongate end sections each having a bore through one end thereof, said end sections each having means on the other ends thereof for aligning said bores, said housing having a threaded bore disposed transverse to said aligned bores;
   b. an elongate guide member having one end threaded for mounting in said threaded bore for rotatably supporting an elongate drive shaft;
   c. an elongate driven shaft rotatably supported in said aligned bores and having opposite ends thereof extending from said housing transversely to said drive shaft;
   d. first and second internmeshing bevel gears within said housing, said first bevel gear being on one end of said drive shaft and said second bevel gear being on said driven shaft intermediate the ends thereof;
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5. A portable power-sanding device comprising:
   a. a housing having a pair of elongate end sections said end sections each having a bore therein aligned with the other;
   b. a driven shaft rotatably supported in said bores and having an end extending from a housing end section;
   c. a drive shaft;
   d. an elongate drive shaft guide member removably supported by said housing, said guide member having a bore transversely of the driven shaft, said drive shaft being rotatably supported in said bore of said guide member and having one end extending therefrom;
   e. a power tool including a drill chuck attached to said one end of the drive shaft and operative to rotate same;
   f. gears within said housing operatively connecting said drive and driven shafts;
   g. an elongate sanding drum mounted on said housing operatively transmitting therefrom and to said housing; and
   h. an arm secured relative to the housing and extending therefrom substantially in a plane through the drive shaft and transversely of the driven shaft.

6. A portable power-sanding device as set forth in claim 5 including:
   a. said gripping handle extending laterally of said arm substantially parallel to the driven shaft and spaced from the sanding drum;
   b. a guard member fixed on said arm and positioned between the gripping handle and the sanding drum to protect an operator's hand from engagement with the sanding drum.