July 25, 1961 R. F. WEST 2,993,311

ROTATABLE DISC SANDER AND THE LIKE

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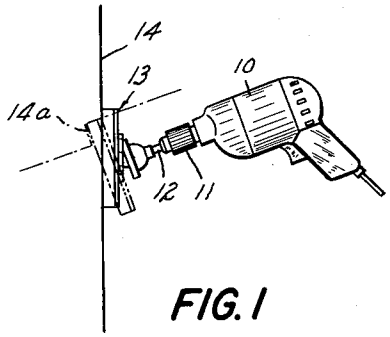


FIG. 1

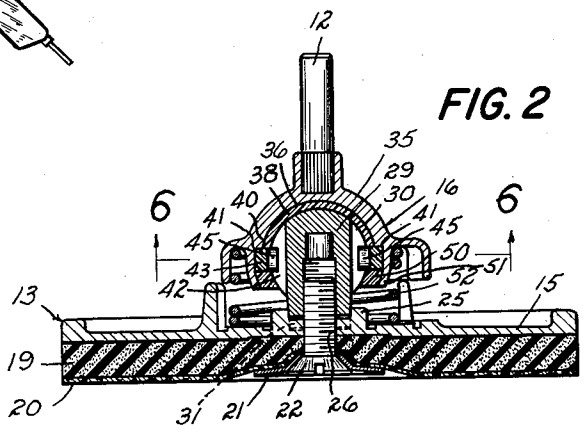


FIG. 2

FIG. 3

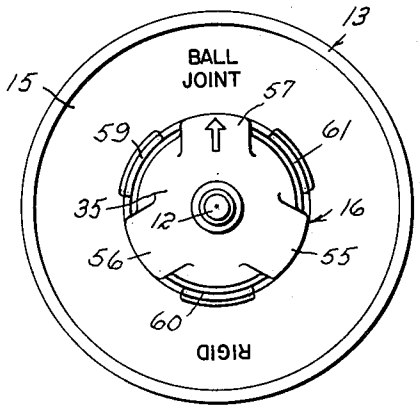
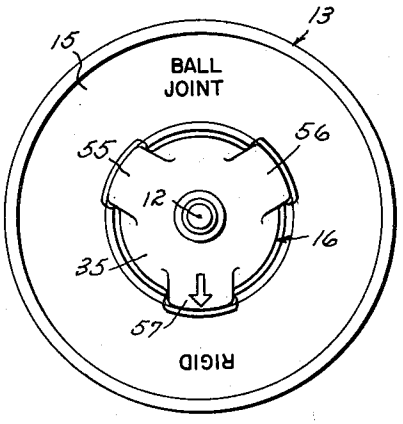


FIG. 4



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FIG. 5

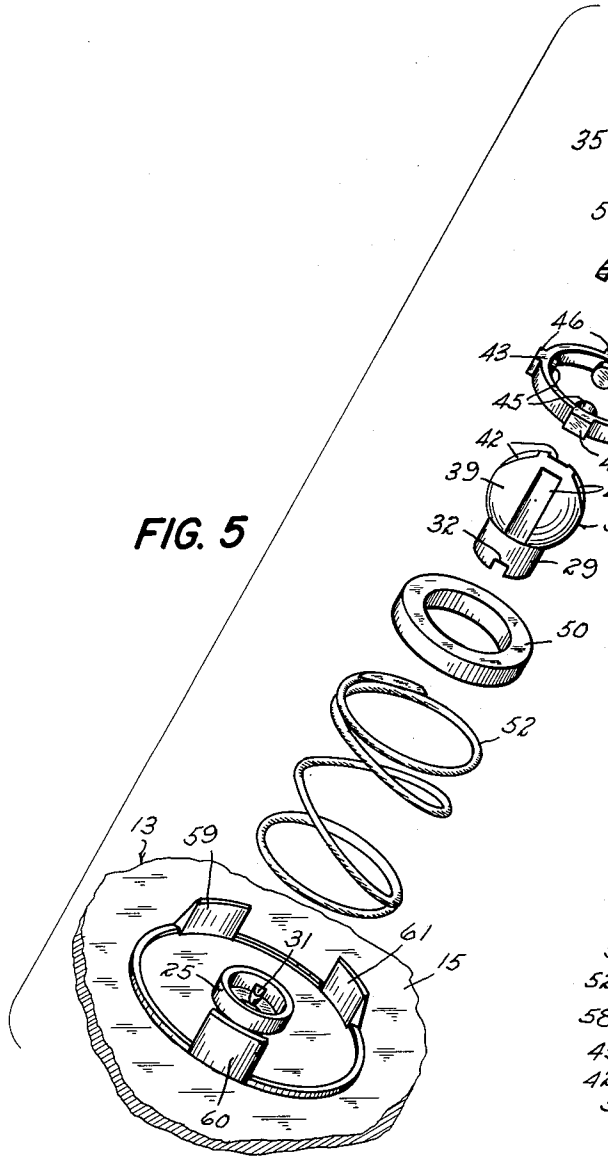


FIG. 6

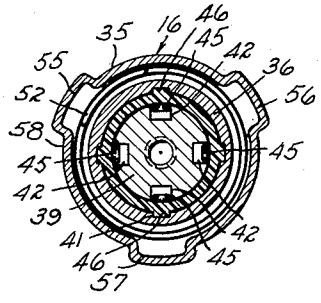
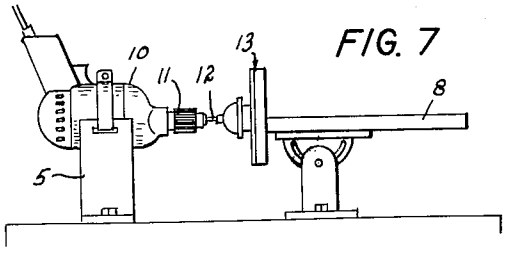


FIG. 7



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2,993,311

ROTATABLE DISC SANDER AND THE LIKE

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6 Claims. (Cl. 51—195)

This invention relates to disc sanders and buffers and the like and particularly relates to such a disc sander or the like having an improved driving coupling between the shank and the disc thereof whereby the utility and operation of the tool is improved.

Disc sanders and buffers and the like are intended to be rotated such as by means of a portable electric drill or by any fixed or flexible power shaft with the flat of the disc facing the surface of the workpiece. When other than a universal type of connection is employed between the shank and body portion of the sander, it is virtually impossible for the operator to manually maintain the working surface in flat engagement with the surface of the workpiece being treated. An improved disc sander and buffer available commercially provides a swivel connection between the disc and shank to permit the disc to remain in flat engagement with the workpiece throughout a wide range of angular positions of the shank relative to the disc which largely overcomes the difficulties experienced with rigid-type sanders of the prior art. However, it has been found that while the swivel joint type of sander will generally provide greatly improved performance, particularly when wide surfaces are being treated, it has the disadvantage resulting from the swivel action of not being able to apply necessary pressure when the sander or buffer is required to work on a narrow edge of a width substantially less than the diameter of the disc. Additionally, when it is desired to mount the device on a fixed power spindle in order to use the disc as a surface sander, for example, it is necessary to have a rigid connection and a rigid disc on which to secure the abrasive paper.

It is therefore an object of this invention to provide an improved sanding disc or the like having the advantages of a swivel joint type of sander, while at the same time overcoming the disadvantages of such a sander when used, for example, on narrow surfaces or when used with a fixed power spindle for flat sanding or buffing.

It is a further object of the invention to provide an improved disc sander and buffer or the like which is simple and convenient for the operator to use and which will operate effectively over long periods of time without failure or undue wear.

Another object is to provide such a disc sander or the like which is economical to fabricate and assemble so that it can be provided commercially at reasonable cost.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

FIG. 1 is a side view of a disc sander embodying the invention being driven by a portable electric drill;

FIG. 2 is a cross section view of the disc sander of FIG. 1 in one of its operating positions;

FIG. 3 is a top plan view of the disc sander of FIG. 2;

FIG. 4 is a top plan view of the disc sander in a second operating position;

FIG. 5 is a partial exploded perspective view showing the elements of the invention;

FIG. 6 is a cross section view taken along the lines 6—6 of FIG. 2; and

FIG. 7 is a side view of the disc sander of FIG. 1 mounted for use as a bench tool.

The disc sander or buffer of the present invention is similar in many respects to the disc sander or buffer described in the Porter Patent No. 2,854,829 dated October 7, 1958, which is being manufactured commercially by the assignee of the present invention. Referring particularly to FIG. 1, it is seen that a typical use of the improved disc sander or buffer is as an attachment for sanding and buffing operations utilizing a conventional portable electric drill **10**, whose chuck **11** is connected to the shank **12** of the disc sander **13** in the usual manner. The solid line position of FIG. 1 shows sander **13** in what is hereinafter described as the "ball joint" position and in flat engagement with a relatively large work surface **14** whereas the dotted line position shows sander **13** in what is hereinafter described as the "rigid" position and in engagement with the ledge **14***a* having a work surface that is substantially less in width than the diameter of the sander. The portable electric drill **10** can also be bench mounted on drill stand **5** (see FIG. 7) with sander **13** in the rigid position adjacent the edge of adjustable table **6** so that workpiece **8** can be moved across the working face of the sander.

As seen more clearly in FIG. 2, the shank **12** of my improved sander is connected to the disc **15** through a driving connection designated generally as **16**. The disc **15** is a rigid casting having bonded or otherwise affixed thereto a sponge rubber pad **19** to which a sandpaper disc **20** or the like may be secured by washer **21** and screw **22**. Disc **15** is centrally apertured at **26** to receive the screw **22** which passes therethrough into threaded engagement with the internally threaded stem **29** of the ball coupling element **30**. Flange **25** on the inner face of disc **15** is in the nature of a socket dimensioned to receive and position the stem **29** so that when the screw **22** is tightened, a substantially rigid connection is formed between the disc **15** and the ball **30**. A pair of diametrically opposed driving lugs or ribs **31** extend radially inwardly from the flange **25** and form a tongue for engagement in a slot **32** formed in the bottom surface of stem **29** of ball **30** to establish a positive driving connection therebetween. Because of the diametric arrangement of the ribs **31** and the slot **32**, the disc **15** may be assembled on the stem **29** in either of two relatively rotated positions 180° apart.

Ball **30** cooperates with a socket member or second coupling element **35** to permit angular movement or tilting of shank **12** relative to disc **15**. Socket member **35** is provided with a generally spherical internal recess **36** having a plastic liner or cup **38** forming a bearing surface for spherical portion **39** of ball **30**. Socket member **35** is also provided with an inner rim **40** having four spaced notches or slots **41**. Spherical portion **39** of ball **30** is provided with four equally spaced transverse slots **42**. Driving ring **43** establishes rotatable driving engagement between socket **35** and ball **30** by virtue of the engagement of round inner projections **45** with transverse ball slots **42** and the engagement of outwardly extending generally rectangular projections **46** with mating notches or slots **41**. The socket cup, driving ring and ball are held together as an assembly by retainer ring **50** which is locked against rim **40** of the socket member by press closing flange **51** of socket member **35**. The spring **52** acts between disc **15** and socket member **35** to resiliently urge the shank **12** into a position perpendicular to disc **15**. Shank **12** is provided with a knurled or grooved region which is press fitted or preferably permanently embedded into a recess in the top of socket

member 35 when die cast so that the socket 35, in effect, constitutes a lower part of the shank 12. The shank 12 may be of conventional form suitable for connection by means of chucks or otherwise to a source of turning power such as an electric drill.

In the preferred embodiment illustrated in the drawings, three radially extending abutments or shoulders 55, 56 and 57 are formed integrally on socket 35 as radial protuberances on the outer rim 58 which are positioned at 120° intervals about the periphery thereof. For cooperation with the shoulders 55, 56 and 57 three upstanding abutments or lugs 59, 60 and 61 are formed integrally on disc 15 and these are spaced radially and circumferentially in the same manner as the shoulders 55, 56 and 57. As a result of this spacing and relationship of the shoulders 55, 56 and 57 and lugs 59, 60 and 61, the disc 15 may be secured to the stem 29 selectively in a relatively rotated position such that the shoulders are positioned intermediate the lugs or are in alignment or registry therewith. When the shoulders are positioned intermediate the lugs in staggered relationship, as shown in FIGS. 2 and 3, shank 12 is free to tilt relative to the disc 15 and thus the shoulders and lugs do not interfere with the normal use of the ball joint universal connection. However, when the disc 15 is turned 180° relative to the stem 29 and hence relative to the socket 35 to the position shown in FIG. 4, the abutments 55, 56 and 57 are in vertically aligned engagement with projections 59, 60 and 61 preventing tilting movement of the shank 12 relative to the disc 15 and thus forming a rigid driving connection between the shank and disc. As previously explained, disc 15 may be positioned in either rotated position simply by loosening the screw 22 and giving the disc 15 a half turn to permit the ribs 31 to again re-enter the slot 32 to form the driving connection.

To facilitate the change from ball joint operation to a rigid connection and vice versa and to present a visual indication of the condition in which the sander has been placed, indicia in the form of an arrow is provided on the abutment 57 which extends generally parallel to slot 32 in the cylindrical portion 29 of ball 30, and the upper surface of disc 15 is provided with indicia which are aligned with the diametrically opposed projections 31 in recess 25. In the embodiment shown, the legend "rigid" is positioned, such as by die casting, adjacent projection 60 and the legend "ball joint" is positioned diametrically opposite the legend "rigid" and in the space between projections 59 and 61. Thus, the desired positioning or assembly of the cooperating elements may be readily attained and is indicated by the registry of the arrow with words "rigid" or "ball joint" as the case may be.

From the foregoing description of the structure and operation of my improved disc sander, it will be apparent that there has been provided a simple and convenient arrangement whereby the operator may easily and quickly convert the sander or the like for either a rigid or swivel joint type of operation as desired, thus greatly increasing the usefulness and versatility of the tool. While I have described a specific embodiment of the invention, modifications and variations of the structure described will be apparent to persons skilled in the art without departure from the spirit and scope of the invention, and such modifications and variations are intended to be included within the scope of the invention.

I claim:

1. In a sanding tool and the like, a shank for attachment to a source of rotary power, a disc extending transversely of the shank, means on the shank and disc forming a driving connection therebetween permitting tilting movement of the shank relative to the disc, and interlocking means between the shank and disc selectably movable into a first rotated position preventing tilting movement of the shank relative to the disc and into a second rotated position permitting said tilting movement.

2. In a sanding tool and the like, a shank for attachment to a source of rotary power, a disc extending transversely of the shank, means on the shank and disc forming a driving connection therebetween permitting tilting movement of the shank relative to the disc, means for attaching the disc to the driving connection in a plurality of rotated positions relative to the shank, and means on the shank and disc preventing tilting movement of the shank relative to the disc in one of said rotated positions and permitting said tilting movement in another of said rotated positions.

3. In a sanding tool and the like, a shank member for attachment to a source of rotary power, a disc extending transversely of the shank member, a driving connection between the shank and disc including a universal joint providing for tilting movement of the shank relative to the disc, means for attaching the disc to the universal joint in a plurality of rotated positions relative to the shank member, and projections on the disc and shank member which are disposed in aligned relationship in one of said rotated positions to prevent tilting movement of the shank relative to the disc and which are disposed out of alignment in another of said positions to permit said tilting movement.

4. In a sanding tool and the like, a shank for attachment to a source of rotary power, a disc extending transversely of the shank, a swivel driving connection between the shank and disc comprising a socket member secured to the shank and a ball secured to the disc, means for varying the rotated position of the disc relative to the socket member, and projections on the socket member and the disc which are in staggered relationship in one of said rotated positions to permit tilting movement of the shank relative to the disc and which are in abutting relationship in another of said positions to prevent said tilting movement.

5. In a sanding tool and the like, a shank for attachment to a source of rotary power, a disc extending transversely of the shank, a universal joint interconnecting the shank and disc comprising a cup member fixed to the shank and a ball member disposed in the cup member, means for attaching the disc to the ball in a plurality of rotated positions, and shoulders on the cup member and projections on the disc which are disposed in staggered relationship in one of said rotated positions to permit tilting movement of the shank relative to the disc and which are disposed in abutting relationship in another of said rotated positions to prevent said tilting movement.

6. In a sanding tool and the like, a shank for attachment to a source of rotary power, a disc extending transversely of the shank, a universal joint interconnecting the shank and disc comprising a ball member and cup member receiving the ball member and secured to the shank, a tongue and groove attachment between the disc and ball member permitting the disc to be secured to the ball member in a plurality of relatively rotated positions, a plurality of spaced apart radial shoulders on the cup member, and a plurality of circularly arranged upstanding lugs on the disc, said shoulders and lugs being disposed in staggered relationship in one of said relatively rotated positions of the disc and being disposed in abutting relationship in another of said relatively rotated positions of the disc.

References Cited in the file of this patent

UNITED STATES PATENTS

2,854,829 Porter ---------- Oct. 7, 1958

FOREIGN PATENTS

582,256 France ---------- Oct. 10, 1924
911,081 France ---------- Feb. 25, 1946