

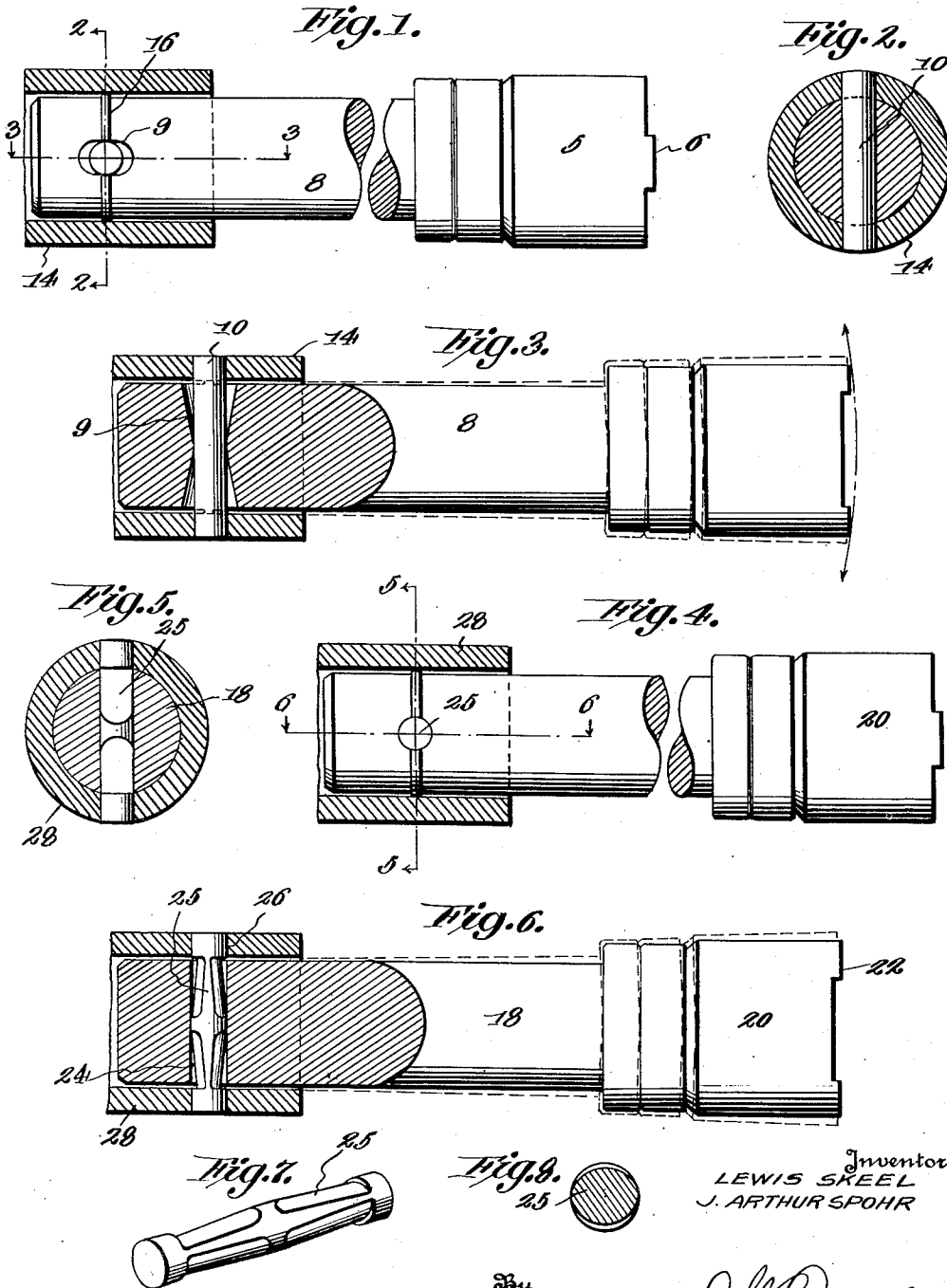
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L. SKEEL ET AL

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FLOATING TOOL

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Inventors
LEWIS SKEEL
J. ARTHUR SPOHR

J. H. Quezada
Attorney

UNITED STATES PATENT OFFICE

LEWIS SKEEL AND JOHN ARTHUR SPOHR, OF MEADVILLE, PENNSYLVANIA

FLOATING TOOL

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This invention relates to floating tools and more particularly to the motion transmitting means between the tool shank and the driving means therefor.

More specifically, the invention forming the subject matter of this application will be found to provide a universal driving connection between the tool and the driving means therefor, which driving connection is free of the backlash that has been found so objectionable in tools of this type.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawing forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a fragmentary side elevation of the improved tool, the driving sleeve being shown in section.

Figure 2 is a vertical transverse sectional view taken on line 2—2 of Figure 1,

Figure 3 is a fragmentary side elevation of the tool, that part which is shown in section being taken on line 3—3 of Figure 1,

Figure 4 is a fragmentary side elevation illustrating a modification of the invention,

Figure 5 is a vertical transverse sectional view taken on line 5—5 of Figure 4,

Figure 6 is a fragmentary side elevation of the form of invention illustrated in Figure 4, a part being shown in section and taken on line 6—6 of Figure 4,

Figure 7 is a perspective of a driving pin illustrated applied in Figures 4 and 6,

Figure 8 is a transverse sectional view through the pin shown in Figure 7.

In the drawing, the numeral 5 designates a cutting head having the forward portion thereof provided with suitable cutting means 6. A shank 8 is extended rearwardly from the head 5 and is provided in the rear portion thereof with a transverse opening 9 receiving a driving pin 10.

Figure 3 illustrates that the end portions of the driving pin 10 are extended beyond the periphery of the shank 8 and have a pressed fit within oppositely located openings in a driving sleeve 14.

Of course, the shank 8 is somewhat less in diameter than the inside diameter of the sleeve 14 to allow of limited oscillation of the tool head 5 as an incident to operation, which oscillation is intended to adapt the tool to irregularities in the work, all of which is understood to those skilled in the art to which this invention relates. A circumferential rib 16 is formed on the periphery of the shank 8 in the plane of the axis of the hole 9 and has a free fit within the sleeve 14.

The side walls of the opening 9 will be found to be parallel throughout for contact with the opposed sides of the driving pin 10 so that backlash is avoided. Of course, the shank is free to rock about the longitudinal axis of the pin 10. To allow of a similar rocking of the shank about a line extending transversely through the central portion of the pin 10, the end walls of the opening 9 diverge from the longitudinal center of the shank to the periphery of the shank. It is old, of course, to ream the opening 9 from opposite ends thereof to give the opening the form of two truncated cones but such an arrangement has the disadvantage of backlash. The herein disclosed construction will be found to provide a universal connection between the shank 8 and the driving member 14 therefor without the disadvantage of backlash common to floating tools in which the opening 9 is reamed from opposite ends thereof with cone-shaped reamers.

In the form of invention illustrated in Figure 6, the shank is designated by the numeral 18 and has the forward portion thereof formed with a cylindrical head 20 having suitable cutting devices 22.

The rear portion of the shank 18 is formed with a transverse cylindrical opening 24 of uniform diameter throughout and adapted to be positioned in registration with the openings 26 of a driving sleeve 28. Of course, the driving sleeve 28 has sufficient clearance about the shank 18 to permit the oscillation suggested in dotted lines in Figure 6. The pin 25 has a pressed fit within the oppositely located openings in the driving sleeve 28.

In carrying out the modified form of in-

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vention illustrated in Figures 6, 7 and 8, the driving pin is diminished in cross sectional area from the central to the end portions thereof to give those portions of the pin between the central and end portions thereof an elliptical formation by which oscillation of the shank about a line extending transversely through the central portion of the pin is allowed.

Of course, the greatest diameters of the elliptical portions of the pin extend transversely of the axis of the sleeve 28, while the smaller diameters of the elliptical portions of the pin extend parallel to the axis of the sleeve 28 to the end that a limited universal movement of the shank about the point of intersection of the axes of the shank and the pin is permitted.

The cylindrical central portion of the pin 25 has bearing engagement with the adjacent portion of the wall of the opening 24 and the surface of this part may be slightly curved to allow of the desired oscillation.

With reference to the foregoing description taken in connection with the accompanying drawing it will be seen that limited universal movement of the cutter head with respect to the driving means therefor is allowed without the attendant backlash that has been found so annoying in tools of this character.

It will also be apparent that the invention is capable of a variety of mechanical expressions and it is, therefore, to be understood that the forms of invention herewith shown and described are to be taken merely as preferred examples of the same and that such minor changes in arrangement and construction of parts may be made as will remain within the spirit of the invention and the scope of what is claimed.

Having thus described the invention, what is claimed is:

1. In a cutter, a tool having a shank, said shank being provided with a transversely extending opening having parallel side walls, a pin extending through said opening, the end walls of said opening being in diverging relation from the longitudinal center of the shank to the periphery of the shank to allow oscillation of the shank about a line extending transversely of the longitudinal axis of the pin, said shank being formed with an external circumferential rib in the plane of the axis of said opening, and a driving sleeve receiving a portion of said shank and having driving connection with the end portions of said pin.

2. In a cutter, a shank having the rear portion thereof formed with a cylindrical opening of substantially uniform diameter throughout, a driving pin extending through said opening and having the end portions thereof extended beyond the periphery of the shank, said pin being diminished in cross

tional area from the central to said extended end portions thereof to give those portions of the pin between the central and end portions thereof elliptical formation.

3. In a cutter, a shank having the rear portion thereof formed with a cylindrical opening of substantially uniform diameter throughout, a driving pin extending through said opening and having the end portions thereof extended beyond the periphery of the shank, said pin being diminished in cross sectional area from the central to said extended end portions thereof to give those portions of the pin between the central and end portions thereof elliptical formation, the central portion of said pin being cylindrical and concentric with reference to the axis of the pin.

4. In a cutter, a tool having a shank formed with a transverse opening of cylindrical formation, a pin extending through the opening and having longitudinally aligned central and end portions, those portions of the pin between the aligned central and end portions having oppositely located tapering walls and oppositely located parallel walls, the parallel walls being in driving contact with the side walls of said cylindrical opening and the tapering walls being extended inward from the walls of said opening.

5. In a cutter, a tool having a shank, said shank being provided with a transversely extending opening having parallel side walls, a pin extending through said opening, there being means providing for oscillation of the shank about a line extending transversely of the longitudinal axis of said pin, and a driving sleeve receiving a portion of said shank and having driving connection with the end portion of said pin, said shank being formed with a circumferential rib in the plane of the axis of said opening and being intersected by the ends of said opening, said driving sleeve being engaged by said circumferential rib.

In testimony whereof we affix our signatures.

LEWIS SKEEL.
JOHN ARTHUR SPOHR.