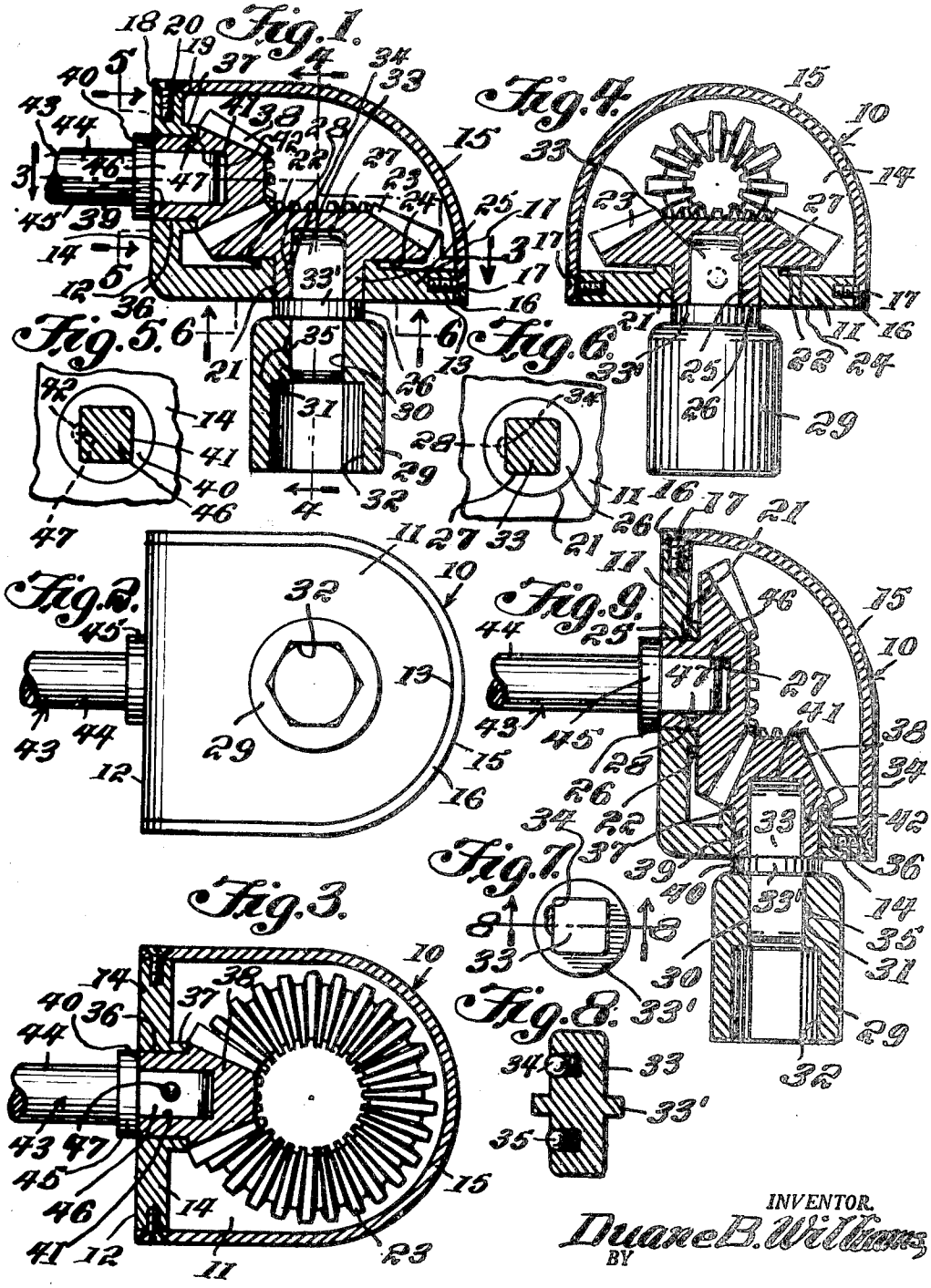
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GEAR-OPERATED WRENCH STRUCTURE

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GEAR-OPERATED WRENCH STRUCTURE

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1 Claim. (Cl. 81—57)

This invention relates to an improved gear operated wrench structure and the primary object of the invention is to provide a more compact, efficient, and more versatile structure of this kind, which is more capable of reaching into and being operated in confined and otherwise hard to reach places, and which is designed to be operated like a reducing gear or a step up gear by merely reversing the connections to the structure of the driving and working elements.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration, rather than limitation, a specific form of the invention is set forth in detail.

In the drawings:

Figure 1 is a central longitudinal section;

Figure 2 is a top plan view of Figure 1;

Figure 3 is a horizontal section taken on the line **3—3** of Figure 1;

Figure 4 is a transverse vertical section taken on the line **4—4** of Figure 1;

Figure 5 is a transverse vertical section taken on the line **5—5** of Figure 1;

Figure 6 is a horizontal section taken on the line **6—6** of Figure 1;

Figure 7 is an end elevation of the removable socket at the left hand side of Figure 1, the driver being removed;

Figure 8 is a longitudinal section taken on the line **8—8** of Figure 7; and

Figure 9 is a view similar to Figure 1 showing the structure in reversed position and serving as a reducing gear for applying greater power to the working element.

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, and first to Figures 1 to 8, the illustrated device comprises a gear case **10** involving an L-shaped base **11** having a squared end **12** and a semi-circular end **13**, and a semi-circular preferably integral right angular flat arm **14** on the squared end **12**. A removable cover **15** of substantially the same horizontal cross section as the base arm **11** and having a semi-circular transverse cross section and a curved longitudinal cross section, has its lower end **16** engaged around the semi-circular end and the sides of the base arm **11** and removably secured thereto by means of screws **17**, and the upper edge **18** is secured to the upper end **19** of the base arm **14** by means of screws **20**.

A journal hole **21** is provided centrally in the base arm **11** and a bearing annulus **22** surrounds the hole **21** at the inner side of the arm **11**. A bevelled gear **23** has an outer side **24** bearing upon the annulus **22** and a stub shaft or shank **25** journaled in the hole **21** having an outer end **26** flush with the outer side of the base arm **11**. The stub shaft **25** is provided with a square socket **27** provided in one side thereof with a hemispherical detent receiving depression **28**.

A wrench head **29** has a square hole **30** in its inner end provided with a hemispherical detent receiving depression **31**, and a larger diameter hexagonal nut receiving

socket **32** in its outer end. A double ended elongated square connecting lug **32** has end portions at opposite sides of a fixed collar **33'** removably engaging in the hole **30** in the wrench head **29** and in the stub shaft socket **27** and is provided with spring pressed ball detents **34** and **35** engaging the depressions **31** and **28**, respectively.

The right angular base arm **14** has a journal hole **36** therein, extending at right angles to the journal hole **21** in the arm **11**, and a bearing annulus **37** surrounds the hole **36** at the inward side of the arm **14**. A bevelled pinion **38**, smaller in diameter than the bevelled gear **23** is in mesh with the gear **23** and bears against the annulus **37**. The pinion **38** has a shank or stub shaft **39** journaled in the hole **36** and has an outer end **40** flush with the outer side of the base arm **14**. The stub shaft **39** has therein a square socket **41** provided in a wall thereof with a detent receiving depression **42**.

A driver **43** includes a shaft **44**, a fixed collar **45** and a square connecting lug **46** which is removably engaged in the pinion socket **41** and has a spring pressed ball detent **47** engaged in the depression **42**, the collar **45** being abutted against the outer end **40** of the stub shaft **39**.

With the foregoing arrangement of the parts, rotation of the driver **43** produces rotation of the wrench head **29** with relatively great power but at a slower speed than the rotation of the driver **43**.

Referring to Figure 9 of the drawings, when it is desired to drive the wrench head at a higher speed than the rotation of the driver **43**, the double ended connecting lug **33** is removed from the gear socket and the driver lug is removed from the pinion socket, the connecting lug **33** engaged in the pinion socket, and the driver lug engaged in the gear socket, the exchange being effected with ease and speed and without any other operations with or adjustments of the parts.

What is claimed is:

In a wrench, a gear case comprising an L-shaped base having a first arm and a second arm positioned at right angles to each other, said arms having journal holes therethrough and outer and inner sides, a bearing annulus on the inner side of each arm and surrounding the journal holes thereof, a beveled pinion having a reduced stub shaft journaled in the journal hole of the first arm with the pinion bearing against the bearing annulus of the first arm, a beveled gear having a reduced stub shaft journaled in the journal hole of the second arm with the beveled gear bearing against the bearing annulus of the second arm, the stub shafts having free terminal ends substantially flush with the outer sides of the arms and having polygonal sockets opening through the terminal ends, the pinion and the gear being in mesh with each other and held in place solely by their meshing engagement with each other and their engagement with the related bearing annulus and the engagement of their stub shafts in the sockets, said stub shafts having annular shoulders intermediate their ends rotatably bearing against the outer sides of the first and second base arms.

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