Aug. 7, 1923. 1,464,298

F. W. STEIN

TOOL

Filed March 20, 1922

Fig. 1.

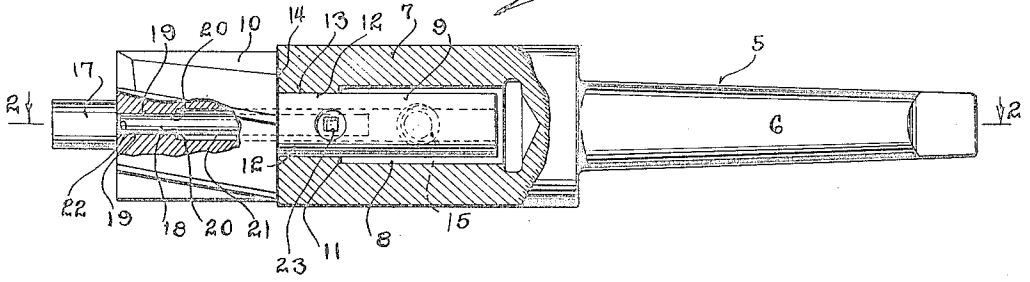


Fig. 2.

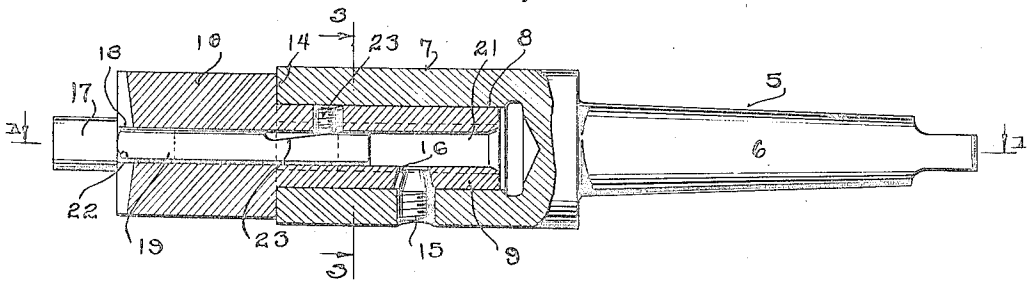
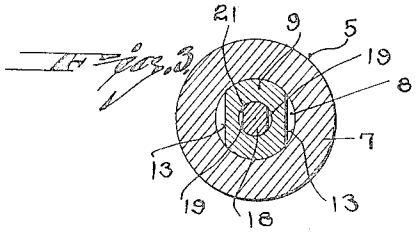


Fig. 3.



INVENTOR.

Fredrick W. Stein

BY

Ira M. Jones.

ATTORNEY.

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UNITED STATES PATENT OFFICE.

FREDRICK W. STEIN, OF KENOSHA, WISCONSIN, ASSIGNOR OF ONE-HALF TO JAMES GIBBONS, OF MILWAUKEE, WISCONSIN.

TOOL.

Application filed March 20, 1922. Serial No. 545,083.

To all whom it may concern:

Be it known that I, FREDRICK W. STEIN, a citizen of the United States, and resident of Kenosha, in the county of Kenosha and State of Wisconsin, have invented new and useful Improvements in Tools, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to certain new and useful improvements in tools and refers more particularly to a general utility and universal tool capable of use for spot facing, counter-boring, core drilling, end milling, profiling and the like.

The ordinary tool of this type is objectionable in that the drive connection between the tool proper and the drive shank is weak and positioned beyond the point where stress is greatest. Furthermore, in the event a pilot is provided, the pilot drive is positioned some distance inwardly of the pilot proper, as a result of which the pilot is twisted off should the same stick or freeze to the work.

Hence with the above and other objections in mind, this invention has for one of its objects to provide a general utility tool having an improved drive connection between the tool member and its drive shank and the pilot and the tool member, whereby breakage under stress is eliminated by reason of their drive connections being adjacent the points where stress is greatest.

It is another important object of this invention to provide a general utility tool having a solid ring of steel around the drive of the tool member as well as the pilot without adding to the cost or complexity of the tool.

This invention has for a further object to provide a general utility tool in which both the pilot and tool member are driven by flats or driving surfaces formed on their shanks, the tool member and pilot being centered by round portions intermediate their flats.

It is a still further object of this invention to provide a general utility tool of the character described in which both the pilot and tool member have shoulders adapted to abut the outer end faces of the tool and driving shank respectively and having independent means for retaining said shoulders and end faces in snug engagement.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view of my improved tool looking on the plane of line 1—1 of Figure 2, parts thereof being broken away and in section to more clearly illustrate structural details;

Figure 2 is a view thereof taken on the plane of line 2—2 of Figure 1, parts being broken away and in section, and

Figure 3 is a transverse sectional view taken through Figure 2 on the line 3—3.

Referring now more particularly to the accompanying drawing in which like numerals designate like parts throughout the several views, the numeral 5 designates a shank portion having an upper taperingly reduced part 6 for engagement with a suitable driving member (not shown) and a lower end 7 enlarged and provided with a central bore 8 for receiving the shank 9 of a tool member 10.

Bore 8, from its outer end to point 11, is provided with two or more flat sides 12 and is back-bored inwardly of point 11 and of a diameter equal to the diameter of that part of the bore between the flats and outwardly of point 11.

Tool shank 9 is also provided with two opposed flattened sides 13 for engagement with the flats 12, and the periphery of shank 9 between the flats 13 is substantially equal

to that of the diameter of the back-bored portion of bore 8.

In operation tool member 10, which is provided with suitable cutting faces, has its shank inserted in bore 8 in the manner illustrated in the drawing with the shoulder 14, formed at the junction of the shank with the tool member, snug against the outer end face of the shank portion. The tool member is removably secured in this position by a set screw or other fastening 15 secured in shank portion end 7 and provided with a tapered end which is engageable with an opening 16 in shank 9, which opening is preferably slightly out of line with fastening 15 whereby the taper of the fastening will normally tend to draw the shank 9 into bore 8.

With this construction it will be seen that a positive drive connection is provided between the shank portion and the cutter at the point of their connection and that a strong ring of steel surrounds this drive connection to insure against breakage by excessive stress.

For spot facing, counter-boring and the like it is highly desirable and practically necessary that a pilot 17 be provided and in this invention the shank 18 of the pilot is provided with two opposite flattened sides 19 which engage flattened drive surfaces 20 of a bore 21 formed in the tool and in which the pilot shank is engageable. As the drive arrangement between the cutter 10 and pilot 17 is substantially identical with that between the cutter and shank portion further description is deemed unnecessary except for the manner of releasably securing the pilot in position in order to retain its shoulder 22, formed at the junction of the pilot proper and shank, in snug engagement with the outer end face of tool 10. This means for securing shank 18 in bore 21 consists of a set screw 23 in the tool member shank which engages with a notch or recess 23 in shank 18 and which increases in depth toward pilot 17 whereby a tightening of the set screw 23 will tend to draw the pilot shank into its bore.

What I claim as my invention is:

1. A tool of the character described, comprising a shank portion having a central tool shank receiving bore communicating with its outer end face, opposite sides of said bore being flattened adjacent the outer end thereof to provide driving surfaces, that portion of the bore inwardly of the driving surfaces being circular in cross section and of a diameter equal to that of the bore points intermediate the driving surfaces, a tool member having a shank of reduced diameter to provide a shoulder for engagement with the shank portion end face, said tool member shank having its opposite sides flattened to provide drive surfaces engageable with the shank portion bore driving surfaces, that portion of the tool member shank intermediate its drive surfaces being circular to fit the circular portion of the bore throughout its length whereby the tool member is centered with respect to said shank portion, and means for securing the tool shank in the shank portion bore.

2. A tool of the character described, comprising a tool member having a central pilot shank receiving bore communicating with its outer end face, opposite sides of said bore being flattened adjacent the outer end thereof to provide driving surfaces, that portion of the bore inwardly of the driving surfaces being circular in cross section and of a diameter equal to that of the bore points between the driving surfaces, a pilot having a shank or reduced diameter to provide a shoulder for engagement with the tool member end face, said pilot shank having opposite sides thereof flattened to provide drive surfaces engageable with the driving surfaces of the tool member bore, that portion of the pilot shank intermediate its drive surfaces being circular to fit the circular portion of the bore throughout its length whereby the pilot is centered with respect to the tool member, and means for securing the pilot shank in the tool member bore.

3. A tool of the character described, comprising a shank portion having a central tool shank receiving bore communicating with its outer end face, opposite sides of said bore being flattened adjacent the outer end thereof to provide driving surfaces, that portion of the bore inwardly of the driving surfaces being circular in cross section and of a diameter equal to that of the bore points intermediate the driving surfaces, a tool member having a shank of reduced diameter to provide a shoulder for engagement with the shank portion end face, said tool member shank having its opposite sides flattened to provide drive surfaces engageable with the shank portion bore driving surfaces, that portion of the tool member shank intermediate its drive surfaces being circular to fit the circular portion of the bore throughout its length whereby the tool member is centered with respect to said shank portion, means for securing the tool shank in the shank portion bore, said tool member having a central pilot shank receiving bore communicating with its outer end face, opposite sides of said tool member bore being flattened adjacent its outer end to provide driving surfaces, that portion of the tool member bore inwardly of the driving surfaces being circular in cross section and of a diameter equal to that of the bore points between the driving surfaces, a pilot

having a shank of reduced diameter to provide a shoulder for engagement with the tool member end face, said pilot shank having its opposite sides flattened to provide drive surfaces engageable with the tool member bore driving surfaces, that portion of the pilot shank intermediate its drive surfaces being circular to fit the circular portion of the tool member bore throughout its length whereby the pilot is centered with respect to the tool member, and means for securing the pilot shank in the tool member bore.

In testimony whereof I affix my signature.

FREDRICK W. STEIN.