Oct. 25, 1949. N. C. SMITH ET AL 2,486,335

TWIST DRILL GRINDING FIXTURE

Filed Jan. 14, 1946 2 Sheets-Sheet 1

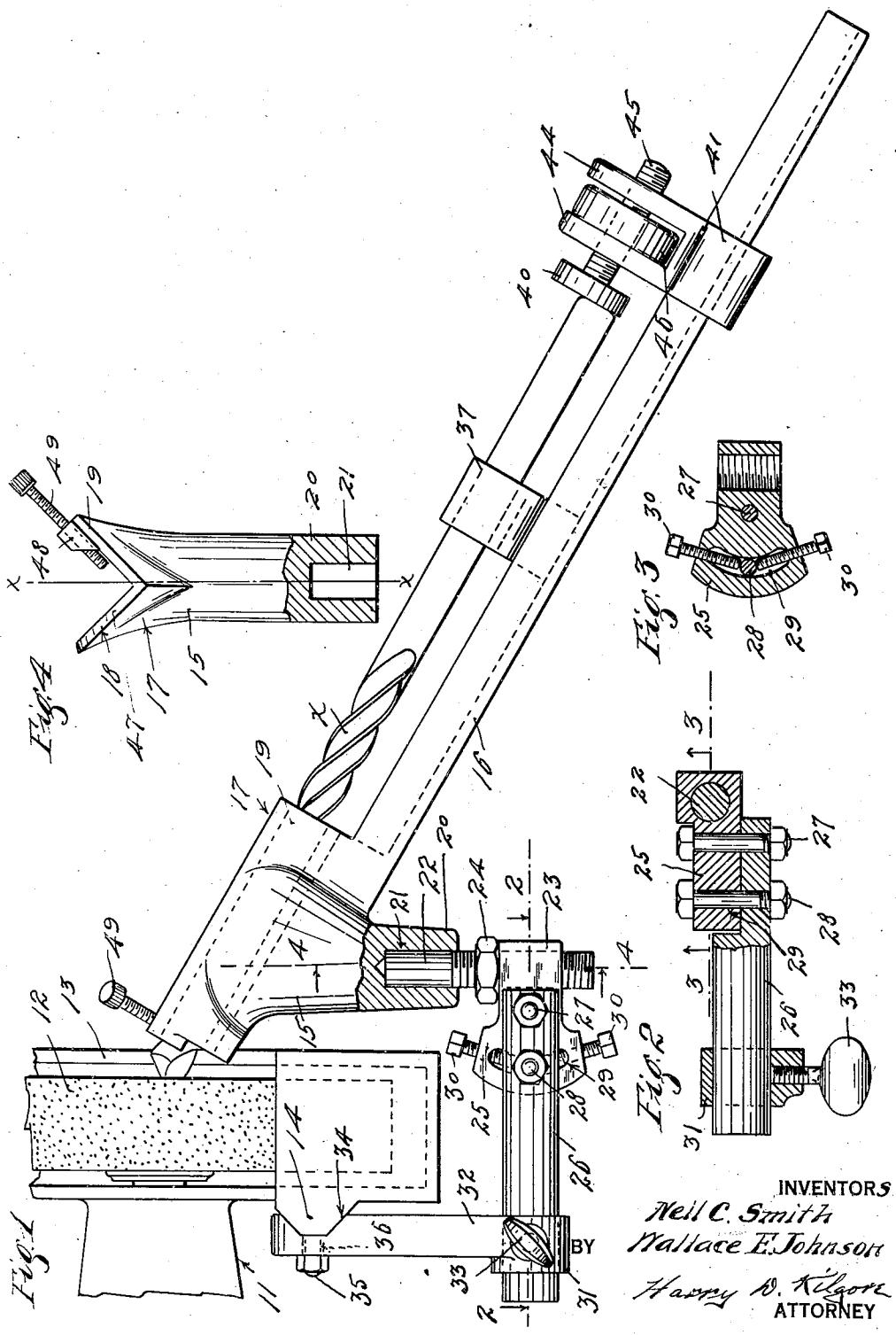

Fig. 1

Fig. 4

Fig. 3

Fig. 2

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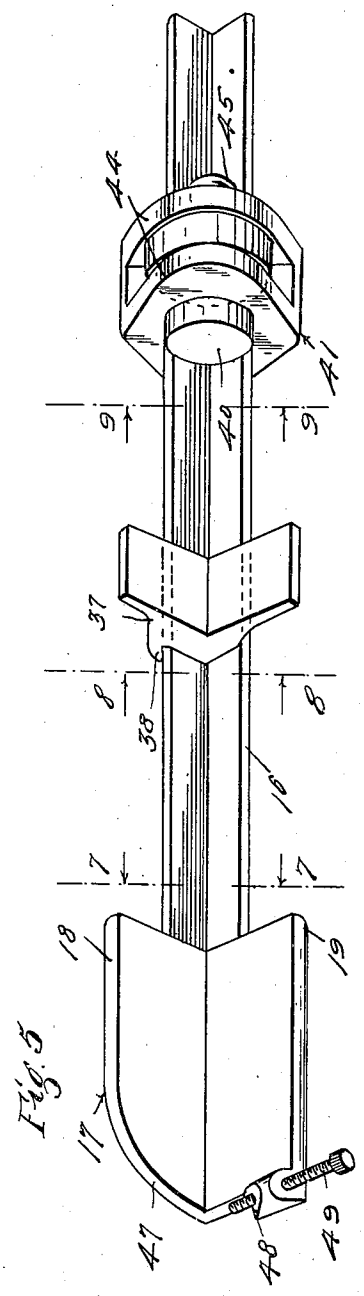

Fig. 5

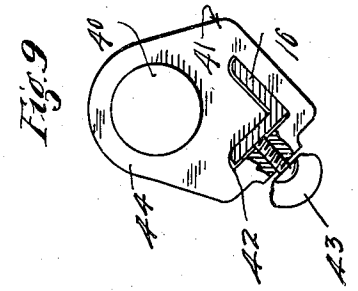

Fig. 9

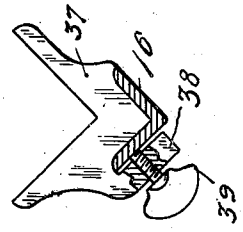

Fig. 8

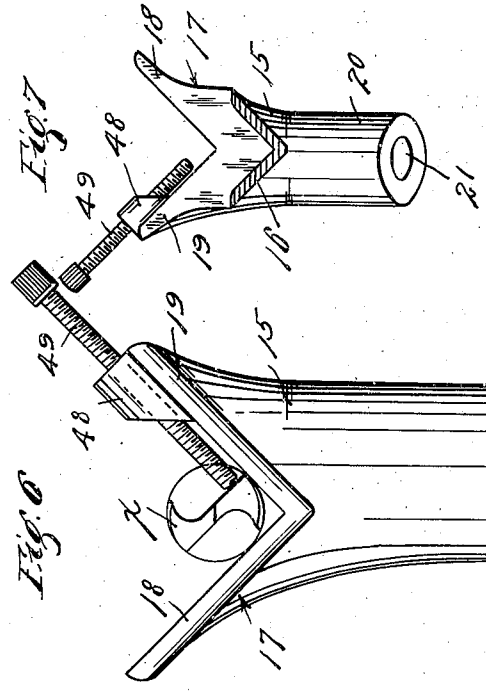

Fig. 7

Fig. 6

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TWIST DRILL GRINDING FIXTURE

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5 Claims. (Cl. 51—219)

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Our present invention relates to improvements in grinding fixtures for regrinding twist drills.

It is well known in shop practice that in order to obtain the maximum efficiency and life from a twist drill, it is absolutely essential that it be properly ground at the point. The two cutting edges must be, first, of exactly the same length and, second, of the same inclination to the axis of the drill. Another important thing to be considered in grinding drill points is the angle of lip clearance or the proper backing off of the cutting edges.

An objective of this invention is to provide a twist drill grinding fixture having novel means for adjusting a twist drill relative to a grinding wheel, whereby one of its lips may be ground to a predetermined angle to the axis of the drill and at the same time, the respective lip will be ground to a predetermined angle at its cutting edge for lip clearance or the proper backing off of the cutting edge.

Another object of this invention is to provide a twist drill grinding fixture having novel means for raising or lowering a drill for engagement with a grinding wheel at a predetermined point.

Still another object of this invention is to provide a twist drill grinding fixture on which a drill may be repositioned after grinding one of its lips so that the other lip will be ground at exactly the same angle and length as the first noted lip.

Other objects of the invention will be apparent from the following description, reference being had to the accompanying drawings.

To the above end, the invention consists of the novel devices and combination of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a side elevation of the twist drill fixture, attached to a grinder fragmentarily shown, a portion of said fixture being broken away and sectioned;

Fig. 2 is a detail view partly in plan and partly in section taken on line 2—2 of Fig. 1;

Fig. 3 is a detail view principally in section taken on the line 3—3 of Fig. 2;

Fig. 4 is a view partly in front end elevation and partly in section taken on the line 4—4 of Fig. 1;

Fig. 5 is a top view of the grinding fixture removed from its support;

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Fig. 6 is a fragmentary front end elevation of the parts shown in Fig. 5, on an enlarged scale; and

Figs. 7, 8 and 9 are detail views with some parts sectioned on the lines 7—7, 8—8 and 9—9 of Fig. 5, respectively.

For the purpose of showing the grinding fixture in working position, there is shown in Fig. 1 a fragment of a grinder, indicated as an entirety by the numeral 11, with the exception of its grinding wheel 12 and the wheel guard 13 having a horizontal way 14. This way 14 is below the axis of the wheel 12 and parallel thereto. The grinder 11 may be either of the bench or pedestal type.

The improved twist drill grinding fixture includes a body member 15 having a long rear extension 16 in the form of an angle bar. In the top of the body member 15 is a trough-like drill rest 17 that is V-shaped in cross-section and the side members thereof are designated by the numerals 18 and 19. The angle bar extension 16 is arranged to form a V-shaped trough that is entirely below the drill rest 17. This drill rest 17 and the extension 16 are upwardly inclined in parallel planes and the bottoms thereof are in the same vertical plane.

On the under side of the body member 15 is a hub 20 having therein a vertical bore 21. It is important to note that the bore 21 is laterally offset from a vertical plane in which the bottoms of the drill rest 17 and the extension 16 lie, see broken line x—x on Fig. 4.

The body member 15 is supported on a stud 22 to swing about a vertically disposed axis. This stud 22, at its upper end portion, extends into the bore 21 and the body member 15 rests on the upper end thereof. The stud 22 below the hub 20 has screw-threaded engagement with a nut-acting member 23. A lock nut 24 is applied to the stud 22 above the member 23 and normally impinges the same.

The nut-acting member 23 has a radial extension 25 that is pivoted to a short horizontal shaft 26, at one of its end portions, by a nut-equipped bolt 27 to swing about a horizontal axis. The end portion of the shaft 26 that overlaps the member 23 is semi-circular in cross-section and its flat face bears on the member 23, see Fig. 2. The member 23 is adjustably secured to the shaft 26 for movement about the axis of the pivot bolt 27 by a nut-equipped bolt 28 that extends through a bore in said shaft and a long slot 29 in the member 23. The slot 29 is on the arc of a circle having its center at the axis of the pivot

bolt 27, see Fig. 3. A pair of opposing set-screws 30 have screw-threaded engagement with the member 23, extend into the slot 29 and impinge the bolt 28 at diametrically opposite points.

The shaft 26 extends transversely under the grinding wheel 12, parallel to the axis thereof and is mounted in a hub 31 on the lower end of a bracket 32 for compound endwise and turning movements. A set-screw 33 has screw-threaded engagement with the hub 31, impinges the shaft 26 and holds said shaft where adjusted. The bracket 33, at its upper end portion, has a horizontal groove 34 in which the way 14 extends and supports said bracket for straight line horizontal adjustment relative to the grinding wheel 12. A nut-equipped stud 35 on the way 14 extends through a horizontal slot 36 in the bracket 32 and holds said bracket where adjusted on the way 14.

A secondary drill rest 37 is mounted on the extension 16 for adjustment toward or from the drill rest 17. The bottom of the drill rest 37 is V-shaped in cross-section, snugly fits in the extension 16 and supports said rest for sliding adjustment longitudinally thereon. The top of the drill rest 37 is V-shaped in cross section and the side members thereof are in the same planes as the side members 18 and 19 and the bottoms of said two drill rests are aligned. Integral with the drill rest 37 is a lug 38 that overlaps one of the side members of said rest and is spaced outwardly therefrom. A set-screw 39 has threaded engagement with the lug 38, impinges the respective side member of the extension 16 and holds said rest where adjusted thereon, see Fig. 8.

An adjustable drill stop 40 is mounted on a clamp 41 which in turn is mounted on the extension 16 for longitudinal adjustment thereon. This clamp 41 has a V-shaped passageway 42 through which the extension 16 extends. A set-screw 43 has threaded engagement with the clamp 41, impinges the extension 16 and holds said clamp where adjusted thereon. The clamp 41 is bifurcated to afford a pair of upstanding ears 44 that extend transversely of the extension 16. The stop 40 is in the form of a disk having on its back an axially aligned screw stud 45 that has threaded engagement with the ears 44. Applied to the stud 45 between the ears 44 is a lock nut 46 that impinges one of said ears.

The outer end portion of the side member 18 is rounded at 47 for a purpose that will presently appear. Integral with the outer end portion of the side member 19 is a nut-acting lug 48 that extends outwardly of the ends of said member. A long gauging screw 49 has threaded engagement with the lug 48 and is provided for holding a drill x as shown in Fig. 6.

To regrind a drill, the same is placed on the drill rests 17 and 37, as shown in Fig. 1, and which rests center the drill as shown in Fig. 6. The stop 40 is adjusted to position the drill with its point projecting outwardly of the drill rest 17 for contact with the grinding wheel 12. Next, the bolt 38 is loosened and the member 23 adjusted by the screws 30 to tilt the fixture and hence the drill x, in a vertical plane to position said drill so that one of its lips will be ground at a predetermined angle to the axis of the drill. By adjusting the shaft 26 endwise in the hub 31, the fixture may be adjusted to position the front end thereof the desired distance from the respective face of the grinding wheel 12. The proper contact of the point of the drill with the grinding wheel 12 is substantially on a horizontal line extending outwardly from the axis of said wheel. In the lower end of the stud 22 is a nick for a screw-driver by which said stud may be rotated and endwise adjusted to raise or lower the fixture to position the point of the drill at the desired point on the grinding wheel 12.

To grind one of the lips of the drill, the fixture is turned on the stud 22 from a position in which it extends in a plane perpendicular to the face of the grinding wheel 12, toward the right. During this movement of the fixture, the lateral offset of said fixture relative to the stud 22 will cause said drill to be ground at the proper angle of lip clearance. By adjusting the bracket 32 on the way 14, the fixture may be moved laterally to position the point of the drill the desired distance from the periphery of the grinding wheel 12. The rounded end 47 of the side member 18 permits the required lateral movement of the fixture while grinding the drill. To grind the other lip of the drill, it is only necessary to return the fixture to its original position, lift the drill x from the rests 17 and 37, give the same a one-half turn and replace the drill x in the rests 17 and 37 with its outer end against the stop 40 and its web against the gauging screw 49. This positions the drill x in the rests 17 and 37 so that the other lip of said drill will be ground exactly like the first lip thereof.

The drawings illustrate a commercial form of the invention, but it will be understood that the same is capable of certain modifications as to details of construction, arrangement and combination of parts within the scope of the invention herein disclosed.

What we claim is:

1. In a device of the class described, a supporting member, a member mounted on the supporting member to turn about a horizontal axis and having a vertically disposed stud, an inclined drill rest pivotally mounted on the stud, said member having a vertically disposed slot, a fixed pin on the supporting member and extending into the slot, and a pair of opposing set-screws having threaded engagement with the member and impinging the pin on opposite sides, and operable to vary the inclination of the drill rest.

2. In a device of the class described, a supporting bracket, a horizontally disposed shaft mounted on the bracket for endwise adjustment, the shaft at its outer end portion having a flat side, a member attached to the shaft at its flat side to turn about a horizontal axis, said member having a vertically disposed slot, a nut-equipped bolt on the shaft and extending through said slot and normally holding the member from turning about said axis, a pair of opposing set-screws having threaded engagement with the member and impinging the bolt on opposite sides, a vertically disposed stud having screw-threaded engagement with the member, and a drill rest pivotally mounted on the stud.

3. In a device of the class described, a body member having a V-shaped drill rest, a lug on one of the sides of said rest and extending outwardly and inwardly thereof, and a gauging screw having threaded engagement with said lug for direct engagement with the web of a drill on said rest.

4. In a device of the class described, a supporting member, an adjusting member intermediately pivoted to the supporting member for movement in a vertical plane and having in one end portion a vertical bore and in its other end portion a vertical slot, a stud in said bore and having screw-threaded engagement with the adjusting mem-

ber, a body member turnably mounted on the stud and having an inclined drill rest, and a pair of opposing adjusting screws having threaded engagement with the adjusting member and impinging the pin on opposite sides thereof and operable to change the inclination of the drill rest.

5. The structure defined in claim 4 in which the center of the drill rest is offset from the projected axis of the stud.

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