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K. M. URQUHART

2,700,905

DRILL BIT DEPTH GAUGE

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Fig. 1.

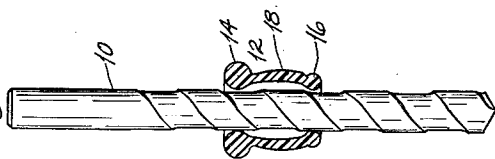


Fig. 2.

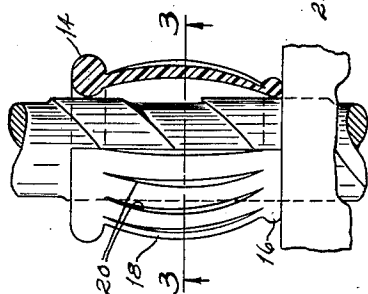


Fig. 4.

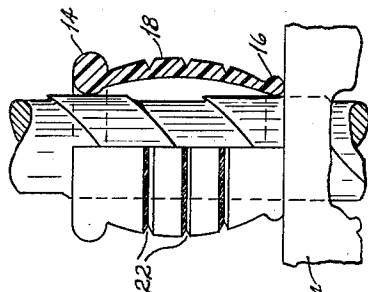


Fig. 6.

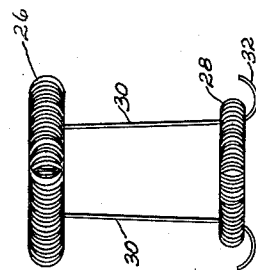


Fig. 3.

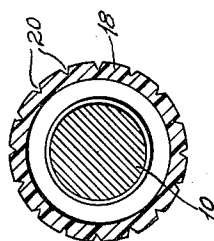


Fig. 5.

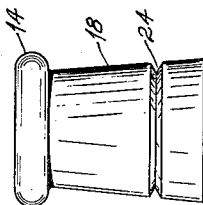


Fig. 7.

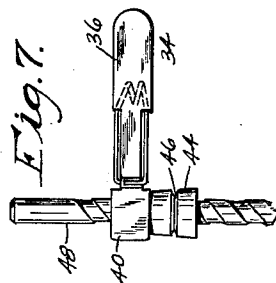


Fig. 10.

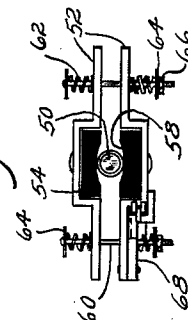
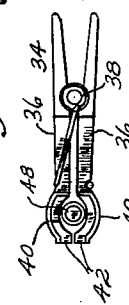


Fig. 8.



INVENTOR.
KENNETH M. URQUHART
BY *J Mac Knight*

ATTORNEY

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DRILL BIT DEPTH GAUGE

Kenneth M. Urquhart, New York, N. Y.

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7 Claims. (Cl. 77—55)

This invention relates to gaging devices and particularly to depth gages for drilling bits. The principal object of the invention is the provision of a simple, rugged and accurate device which can be quickly attached to or placed upon a drill bit at a predetermined distance from the cutting end of the bit so that when the bit has penetrated the work to the predetermined depth a clear indication will be given to the operator.

Various adjustable gages have been devised for use in mass production on hand operated drilling tools and for drilling presses. However, these have been rather expensive and in many instances the devices are adjustable only for a small range of bit diameters. The present device is particularly suitable for home work-shop use or for the professional worker who must drill a large number of holes, no considerable number of which are of the same diameter or depth. If desired the device can be used for mass production work since it can be made inexpensively and will stand more abuse without slipping on the bit than the more rigid mechanical stops or gages. Furthermore, one size gage may be used on bits covering a considerable range of diameters.

In accordance with the preferred form of the invention the device comprises a somewhat cylindrical ring of resilient material such as rubber which can be slipped over the drill bit to the desired position and which will remain at the position on the drill bit without slipping when the outer end of the cylinder comes in contact with the work surface. Assuming that the device is to be used on a drill press in which the bit travels downwardly into the work, the upper end of the gage has a thickened, ring-shaped portion which will grip the outer surface of the bit. The lower or skirt portion of the gage is formed of thinner material and in a barrel shape so that when the lower edge of the device strikes the work surface, continued downward motion of the bit into the work will force the lower edge of the gage upwardly relative to the upper gripping portion, thus causing the skirt portion to belly outwardly at the center. The outer surface of the skirt portion is preferably provided with slits which are normally closed but which will be forced open due to the compressing action of the skirt portion. The interior of the slits is preferably of a color contrasting with that of the outer surface of the gage so that when the slits are forced open due to contact of the lower edge of the gage with the work the color of the interior of the slits will become visible to the operator who will be apprised of the fact that the bit has penetrated to the desired depth. Other embodiments of the invention will be described, one of these comprising a small mechanical clamp having a soft rubber lining for engagement with the outer surface of the bit and a depending skirt portion for contact with the work. The clamp is provided with a vertically slidable measuring rod which can be used as will be explained in the description in placing the clamp on the bit at the proper point.

Referring to the drawing:

Figure 1 is a vertical elevation of a drill bit showing in section one of the rubber gages attached thereto;

Figure 2 is an enlarged vertical sectional elevation of a gage of the type shown in Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a view of a rubber gage similar to that of Figure 2; but with the exterior slits running laterally of the device;

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Figure 5 is a vertical elevation of a slightly different embodiment of a rubber gage;

Figure 6 is a vertical elevation of another embodiment in which the rubber is replaced by metal springs and wires;

Figure 7 is a vertical elevation of a gage adapted to be clamped mechanically to the bit;

Figure 8 is a plan view of the device of Figure 7;

Figure 9 is a vertical elevation of still another embodiment in which a measuring rod is incorporated in the clamp and

Figure 10 is a plan view of the embodiment of Figure 9.

Referring to the drawing a drill bit 10 is shown as provided with a gage shown generally at 12, this gage having a thickened ring-like upper edge 14, a slightly thickened lower edge 16 and an intermediate barrel-shaped skirt portion 18. As shown in Figure 2 the thinner skirt portion 18 is provided with a plurality of vertical or longitudinal slits 20, these slits being normally closed when there is no compression between the upper edge 14 and the lower edge 16 of the device. Figure 2 illustrates the device as under some compression so that the slits 20 are open, thus exposing the interior of the slits. The entire device may be formed of, say, red rubber with the exterior surface colored black, or any other suitable contrasting colors may be used. On compression, that is, when the lower edge 16 comes in contact with the work, the portion 18 will belly outwardly thus opening and exposing the red interior of the slits 20 to the view of the operator who will then know the bit has penetrated the work to the desired depth.

In Figure 4 a slightly different embodiment is shown in which the skirt portion 18 is provided with several lateral slits 22 which will open when the lower edge 16 of the device contacts the surface of the work 24. In Figure 5 still another embodiment of the rubber gage is illustrated. In this form the skirt portion 18 tapers outwardly and is provided with one or more normally open slits 24. When the lower edge of the skirt 18 strikes the work surface the bottom portion will tend to flare outwardly, thus closing the slit 24 and the operator will then not be able to see the two contrasting colors of the device.

In Figure 6 the upper portion of the device comprises a round metal spring 26 which is adapted to slip over and grip the bit. A lower ring-shaped spring 28 is also provided and in place of the solid intermediate skirt portion such as 18 of Figure 2 a plurality of wires 30 of spring metal are attached at their upper end to the ring 26 and are flared outwardly at their lower ends 32. The lower ends of the wires 32 are maintained in normal position by the spring 28 and when the bit has penetrated the work to the proper depth the bottom flared ends 32 of the wires 30 will scrape upon the work surface thus causing a sound which will notify the operator that the proper depth has been reached. This embodiment will also provide a visual indication since the wire ends 32 will sweep away the chips on the surface of the work when the hole has been drilled to the desired depth.

In Figures 7 and 8 is shown a small clamp 34 comprising a pair of symmetrical arms 36 and a metal spring 38 having its ends bent around the arms so as to force the left hand extremities of the arms together as is shown more clearly in Figure 8. The left hand ends of the arms are curved as at 40 and have attached to their inner surfaces as by cementing, a pair of curved rubber elements 42 depending downwardly to form a skirt portion 44 as shown in Figure 7. The skirt portion 44 corresponds to the portion 18 of Figure 5 and is provided with a normally open slit 46 which will tend to close when the lower edge of the skirt 44 engages the work surface. In operation the outer or right hand ends of the clamping arms 36 will be squeezed together and the device slipped over a drill bit 48, the rubber elements 42 serving to grip the bit securely.

Figures 9 and 10 illustrate another embodiment in which a clamp is used to hold the gage on a drill bit 50. A pair of channel-shaped arms 52 are adapted to face each other as shown in Figure 10, the channel portions of the arms having affixed thereto rubber elements

54 depending as shown in Figure 9 and provided with an external slit 56 corresponding to the slit 24 of Figure 5. The inner surfaces of the elements 54 are slightly concave as indicated at 58 for better contact with the drill bit 50. The outer ends of the arms 52 are provided with aligned holes through which rods 60 have slidable engagement. The outer ends of the rods 60 are encircled by compression springs 62 abutting against stops 64 one of which on each rod is adjustable as by means of the nuts 66 on the threaded ends of the rods.

The embodiment of Figures 9 and 10 is provided with means for measuring the distance from the work surface to the lower edge of the resilient skirt 54. One end of arm 52 has attached thereto a bracket element 68 as by means of the rivets 70, this element being shaped so as to provide a vertical slot 72 through which a measuring arm or rod 74 is adapted to slide vertically. The arm 74 is provided with top and bottom shoulders 76 and 78 respectively and an encircling compression spring 80 adapted to hold the arm normally in its upper or retracted position. The arm 74 is preferably provided with indicia as shown in Figure 9.

In using the embodiment of Figures 9 and 10 the arms 52 are pulled apart against the action of the springs 62 and the rubber gripping elements 54 slipped over the bit 50. The measuring arm 74 is then pressed downwardly until the stop 78 is opposite the end of the bit 50 and the body of the device adjusted vertically until a distance equal to the desired hole depth is indicated on the arm 74 directly opposite the lower edge of the rubber skirt 54. The arms 52 are then released and the springs 62 cause the rubber elements 54 to grip the drill bit 50, the arm 74 being retracted upwardly by the spring 80. As has been described with reference to the embodiments of Figures 5 and 7, when the lower edge of the skirt 54 contacts the work surface the rubber skirt will tend to flare outwardly thus closing the slit 56 and providing the operator with a visual indication that the bit has penetrated the work to the desired distance.

I claim:

1. A drill bit gage comprising an elastic ring adapted to be slipped over the bit to a desired position, a skirt member depending from said ring and adapted to be compressed toward said ring when its lower edge engages the work surface, said skirt being provided with a portion normally visible but which becomes invisible when said member is compressed.

2. A drill bit gage comprising an elastic ring adapted to be slipped over into engaging relation with the bit, a flexible member depending from said ring and adapted to expand on engaging the work surface when the bit has reached the desired depth, said member being provided with a plurality of external slits having colored inner surfaces normally invisible but which become visible when said slits open due to expansion of the flexible member.

3. A drill bit depth gage for rotary drills for providing an indication when the bit has reached a predetermined depth in the work being drilled, comprising an elastic ring-shaped member adapted to be slipped on the bit to rotate therewith and positioned at the desired distance from the bit point, said member having upper and lower portions and the upper portion having sufficient tension to cause it to grip the bit and to remain at its position on the bit when the lower portion of the member engages the work surface, and means on said member for providing a visual indication to the operator by a change in color when the member is compressed due to its lower portion engaging said work surface.

4. A device for indicating when a drill bit has reached a predetermined depth in the work being drilled comprising a ring-shaped member of elastic material having

an upper thickened portion and a depending skirt-like portion, said member being adapted to be stretched and slipped over the drill bit to a distance such that the lower edge of the skirt portion will be at a distance from the bit point equal to said predetermined depth, said skirt portion being provided with a circumferential slit normally open to expose a color contrasting with the color of the member's outer surface, but which slit, when the lower edge of the skirt portion engages the work surface, becomes closed to obscure said contrasting color and provide an indication to the operator.

5. A device for indicating when a drill bit has reached a predetermined depth in the work being drilled comprising a ring-shaped member of elastic material having an upper thickened portion and a depending skirt-like portion, said member being adapted to be expanded and slipped over the drill bit to a distance such that the lower edge of the skirt portion will be at a distance from the bit point equal to said predetermined depth, said thickened portion having sufficient tension to cause the member to remain on the bit at the desired position and said skirt portion being provided with a plurality of parallel normally closed slits, the inner edges of said slits being of a color contrasting with the color of said member's outer surface so that when the lower edge of the skirt portion engages the work surface and is pushed upwardly toward said thickened portion said slits will open and expose said contrasting color to the operator.

6. A drill bit gage comprising a flexible member, means for securing said member to the bit at a predetermined position, said member being adapted to expand on engaging the work surface when the bit has reached the desired depth, said member being provided with a plurality of longitudinal slits having colored inner surfaces normally invisible but which become visible when said slits open due to expansion of the flexible member.

7. A drill bit gage comprising a resilient member adapted to be stretched and slipped over the bit to a desired engaging position, a skirt member depending from said resilient member and adapted to be compressed toward said resilient member when its lower edge engages the work surface, said skirt being provided with a colored portion normally visible to the operator but which becomes invisible when said member is compressed.

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