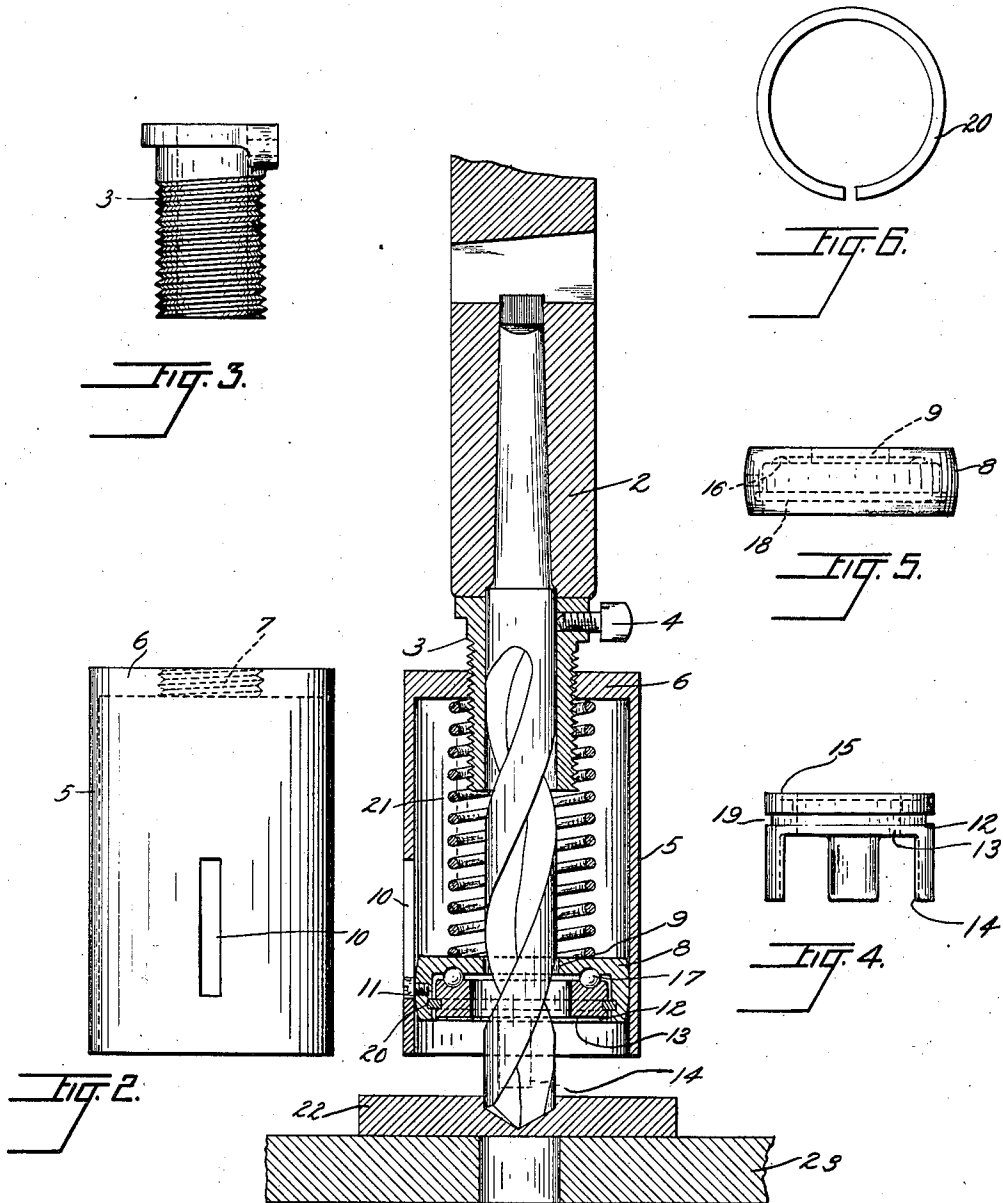


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SAFETY ATTACHMENT FOR HIGH SPEED DRILLS.
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To all whom it may concern:

Be it known that I, LEON J. CAMPBELL, a citizen of the United States, and residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Safety Attachments for High-Speed Drills, of which the following is a complete specification.

Heretofore a great deal of difficulty has been encountered in using high speed drills, by reason of the drills breaking as soon as the drill passes through the work, or, when cleaning holes in castings, if there happens to be a blow-hole in the side of the hole being cleaned, when the drill enters the blow-hole it oftentimes breaks. This breakage is usually caused by the fact that there is more or less play or lost motion in the feeding mechanism of the drill-press, especially in machines which have become worn, which play or lost motion is taken up by the pressure of the feed while the drill is working in solid metal and encountering full resistance, but as soon as the point passes through the work, or enters a blow-hole, the resistance is decreased and the drill tends to creep ahead to the extent permitted by the play or lost motion in the mechanism. When the drill does creep ahead it takes a greater feed for an instant, with the result that the increased strain breaks the drill or pulls it out of the chuck.

The main objects of this invention are to provide a safety attachment for high speed drills adapted to prevent breakage of the drills when the points pass through the work or into a blow-hole; to provide an improved construction adapted to take up the lost motion in the feeding mechanism of a drill-press and prevent the drill from dropping when the resistance of the cut is decreased; and to provide a cheap, simple and durable construction adapted to be mounted on a high speed drill and to prevent the drill from breaking or being pulled from the chuck.

A specific embodiment of the invention is illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal section of a safety attachment for high speed drills embodied in this invention. Fig. 2 is a side elevation of the protecting sleeve. Fig. 3 is a side elevation of the adjusting sleeve. Fig. 4 is a side elevation of the presser-foot. Fig. 5 is a side elevation of the bearing cap

for the presser-foot. Fig. 6 is a side elevation of the locking ring for the presser-foot.

In the construction shown, 1 indicates the high speed drill, of any desired construction, and 2 indicates the chuck of a drill-press in which the drill is mounted. An adjusting sleeve 3 is secured on the drill immediately beneath the chuck by means of a set screw 4 or it may be secured directly to the chuck if desired. Said adjusting sleeve 3 is externally screw threaded, and a protecting sleeve 5, having a head 6 in its upper end with a threaded axial aperture 7 therein, has threaded engagement on the sleeve 3 and is adapted to be adjusted vertically thereon. When the sleeves 3 are secured directly to the drills they may be made of varying internal diameters to fit on various sizes of drills, but their external diameters will all be such as to engage in the aperture 7 of the sleeve 5.

In the lower portion of the sleeve 5 is a vertically movable, inverted cup shaped bearing cap 8 which has an axial aperture 9 in its head through which the drill extends. For the purpose of holding the cap 8 from rotation in the sleeve 5, said sleeve is provided with a longitudinal slot 10 and a key or screw 11 is secured in the side of the cap and projects into said slot. Said key permits the cap to travel vertically in the sleeve but holds it from rotation in the sleeve.

The presser-foot 12 comprises an annular head 13 adapted to extend up into the cap 8 and through which the drill extends, and a plurality of downwardly directed legs 14 which extend below the bottom of the cap 8 and the bottom of the sleeve 5. The adjacent faces of the head 13 and of the head of the cap 8 are provided with registering ball races 15 and 16 respectively in which are bearing balls 17, and in the inner side of the cap 8 and outer side of the presser-foot 12 are registering grooves or seats 18 and 19 respectively, in which is a broken locking ring 20 adapted to hold the presser-foot in the cap and permit the cap to rotate thereon when the presser-foot is held stationary on the work.

Within the sleeve 5 is a coiled spring 21 surrounding the drill which bears at one end against the head 6 of the sleeve and at its other end against the bearing cap 8.

The operation of the construction shown is as follows: The work 22 is placed upon the table 23 of the drill-press and the drill

is fed down into contact with the work. The presser-foot is normally held at the lower limit of its movement in the sleeve 5 by means of the spring 21. The sleeve 5 is then adjusted on the sleeve 3 so that the legs 14 of the presser-foot will contact the work just prior to the time that the point of the drill is to cut through the lower side of the work. When the presser-foot is out of contact with the work it naturally rotates with the drill, but when it contacts with the work, by reason of the forward feed of the drill, the friction between it and the work causes it to stand still while the bearing cap 8 revolves thereon. When the drill is cutting through the solid metal the downward pressure of the feed mechanism on the drill causes any lost motion or play due to wear in said mechanism to be taken up, and, if there is nothing to prevent its doing so, the drill will creep ahead or feed faster to the extent of play in the feed mechanism, as soon as the drill begins to cut through the lower side of the work and the resistance thereon is decreased. This tendency to creep ahead is the direct cause of a large percentage of the breakage of the drills. In applicant's device as soon as the presser-foot strikes the work the tension of the spring 21 is increased and is exerted between the work and the feed mechanism, with the result that when the drill begins to pass out of the work the lost motion is controlled and the drill is prevented from creeping or feeding forwardly faster than the set feed of the feed mechanism, and the danger of breakage due thereto is prevented. In the same manner, in cleaning out holes in the castings, if a blow-hole is visible the sleeve 5 may be adjusted so that the presser-foot will contact the work just prior to the time the drill reaches the blow-hole, and the drill will be held at its set feed. If blow-holes are not visible, or if the hole being cleaned is so irregular in size as to cause varying tensions on the drill, the presser-foot may be set for constant pressure on the work to prevent the drill creeping ahead under varying resistances.

While but one specific embodiment of the invention has been herein shown and described it will be understood that many details of the construction shown may be varied or omitted within the scope of the claims without departing from the scope of said claims.

I claim:

1. A safety attachment for high speed drills, comprising a supporting device rotative with the drill chuck, an annular bearing member rotating with and having axial movement relative to said supporting device, a presser foot, having rotative engagement with said annular bearing member and adapted to engage the work, and a spring

interposed between said supporting member and said annular bearing member and adapted to exert a backward pressure upon said supporting device, when said presser foot is in contact with the work.

2. A safety attachment for high speed drills, comprising a supporting sleeve detachably mounted upon the drill and rotative with the drill chuck, a cylindrical supporting member having screw threaded engagement with said sleeve, an annular bearing member rotative with said cylindrical supporting member, a presser foot having rotative engagement with said annular bearing member and adapted to engage the work, and a spring interposed between a downwardly facing surface of said cylindrical supporting member and said annular bearing member and adapted to exert a backward pressure upon said cylindrical supporting member when said presser foot is in contact with the work.

3. A safety attachment for high speed drills, comprising a cylindrical supporting device mounted on and having endwise adjustment relative to the drill and rotative with the drill chuck, said supporting device being provided with a longitudinal slot, an annular bearing member located within said cylindrical supporting device and provided with a lug having engagement with the longitudinal slot thereof, a presser foot having rotative engagement with said annular bearing member and adapted to engage the work, and a spring interposed between said annular bearing member and said supporting device adapted to exert a backward pressure upon said supporting device when said presser foot is in contact with the work.

4. A safety attachment for high speed drills, comprising a supporting device rotative with the drill chuck, an annular bearing member rotative with and having axial movement relative to said supporting device, a presser foot adapted to engage the work, means connecting said annular bearing member with said presser foot adapted to permit rotation of the bearing member relatively to the presser foot, and a spring interposed between said annular bearing member and said supporting means, adapted to exert a backward pressure upon said supporting means when said presser foot is in contact with the work.

5. A safety attachment for high speed drills, comprising a supporting device rotative with the drill-chuck, an annular bearing member rotative with and having axial movement relative to said supporting device and provided with an annular groove, a presser foot adapted to engage the work and provided with an annular groove, an annular ring engaging both of said grooves thereby loosely connecting said annular bearing member and said presser foot, and a

spring bearing against said annular bearing member and said supporting device and adapted to exert a backward pressure upon said supporting device when said presser foot is in contact with the work.

6. A safety attachment for high speed drills, comprising an adjusting sleeve concentric with the drill and adapted to rotate therewith, a protecting sleeve adjustably mounted on the adjusting sleeve, a vertically movable bearing in the protecting sleeve, a presser-foot journaled in said bearing and a spring interposed between the bearing and the top of the protecting sleeve.

7. A safety attachment for high speed drills, comprising a protecting sleeve concentric with the drill and vertically adjustable with respect thereto, a vertically movable bearing member in the protecting sleeve, a presser-foot mounted in the bear-

ing member, anti-friction bearings between the presser-foot and bearing member, and a spring adapted to hold the bearing member and presser-foot at the lower limit of their movement.

8. A safety attachment for high speed drills, comprising an adjusting sleeve adapted to be attached to the drill, a presser-foot concentric with the drill adapted to engage the work, and means interposed between the presser-foot and sleeve adapted to take up the lost motion of the feed mechanism for the drill.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

LEON J. CAMPBELL.

Witnesses:

JAS. HEALY,
ROBT. KLOTZ.