

Aug. 30, 1949.

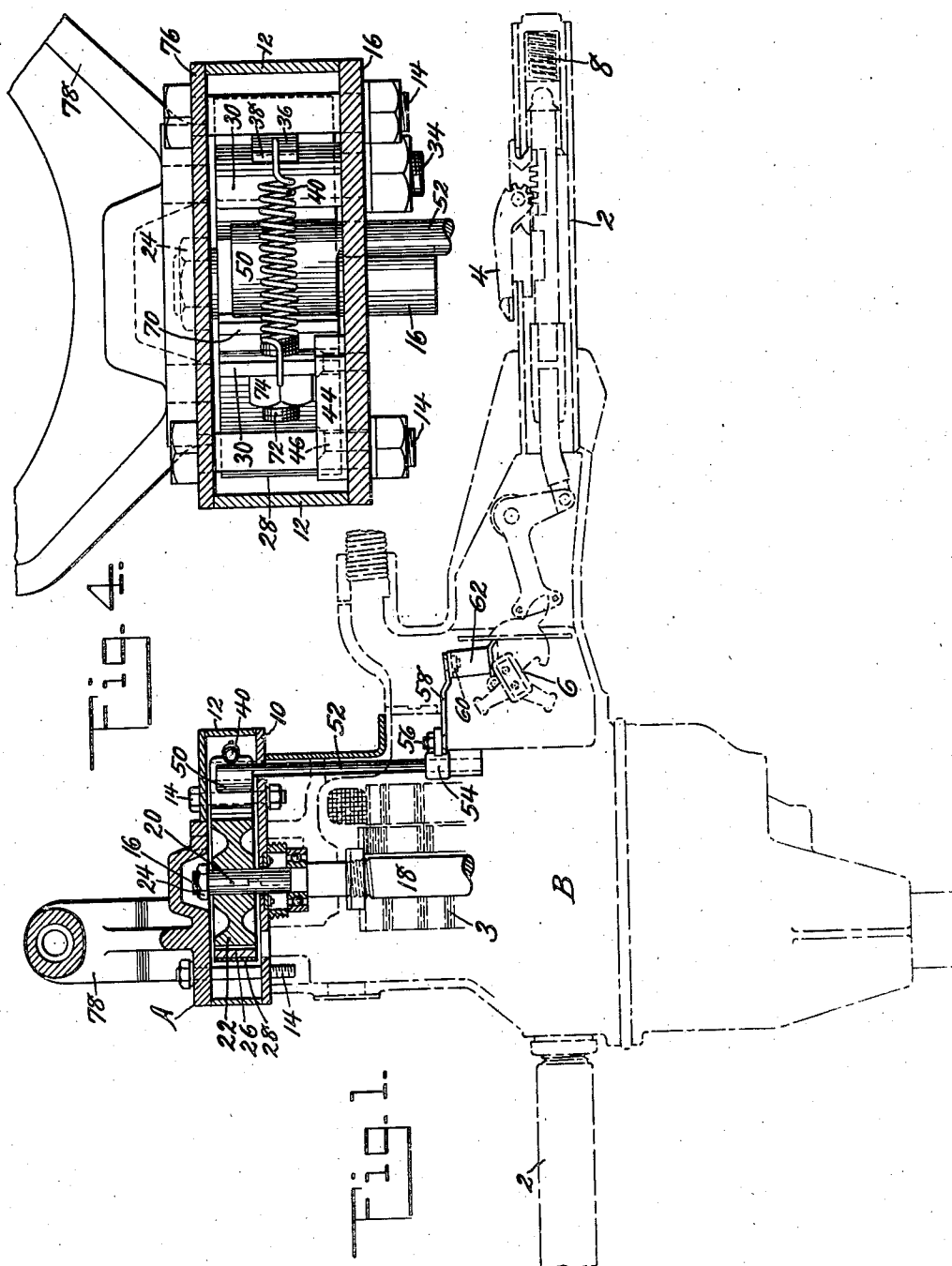
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2,480,343

SAFETY BAND BRAKE FOR HIGH-SPEED TOOLS

Filed Jan. 21, 1943

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

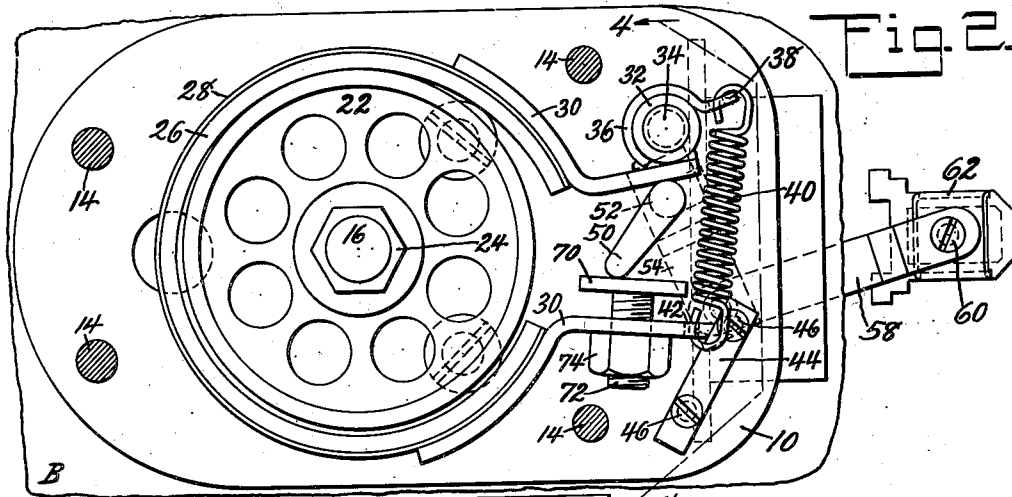
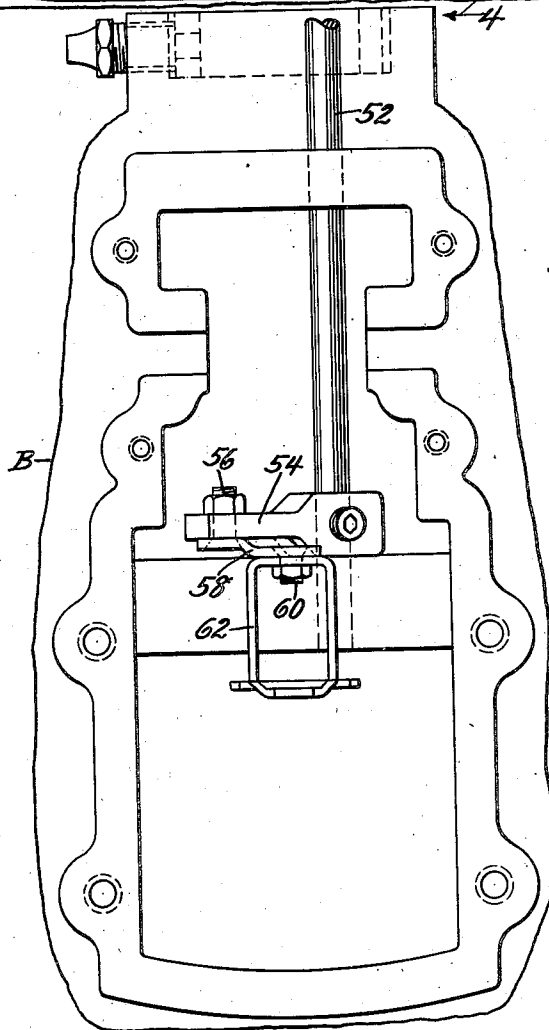


Fig. 3.

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2,480,343

SAFETY BAND BRAKE FOR HIGH-SPEED TOOLS

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Application January 21, 1943, Serial No. 473,107

5 Claims. (Cl. 188—166)

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This invention relates to electrically driven portable tools in general and in particular to high speed electrically driven tools, reamers and such like.

Recently, in order to make drills, reamers, etc., lighter and more easily handled, the trend has been toward extremely high speed motors for driving tools. In addition better steels and coating alloys have been developed permitting higher cutting speeds. The use of high speed tools is always dangerous for if a workman's clothing becomes entangled in the tool an injury is apt to occur almost immediately. It is, therefore, imperative that the tool be stopped immediately upon an emergency arising. It is an object, therefore, of the present invention to provide a device for stopping high speed tools immediately upon breaking of the current supply to the driving motor.

A further object of the invention is the provision of a compact and light weight braking arrangement which can be applied to existing high speed tools with a minimum of modification.

A still further object of the invention is the provision of a brake for a high speed tool, which brake is held off by the operator during use of the tool and immediately applied when for any reason the operator's grip on the tool is relaxed.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which:

Figure 1 is a sectional view of the safety attachment and showing the attachment applied to a high speed tool;

Fig. 2 is a plan view of the attachment with the top cover plate removed;

Fig. 3 is an end view of a portion of the attachment and better disclosing the means by which it may be connected to the tool switch, and

Fig. 4 is a sectional view taken substantially on line 4—4 of Fig. 2 but with the cover plate in place.

Referring now to the drawings in detail, it will be seen that the attachment A in general has been illustrated in full lines and is shown as applied to a high speed tool B indicated in general by line and dash (Fig. 1). The high speed tool as indicated is provided with handles 2, one of which encloses the switch and switch tool mechanism for the motor, the armature of which is indicated at 3. The switch tool mechanism includes a lever part 4 connected by suitable linkage to the switch part 6. As shown in Fig. 1 the lever part 4 is in the position which it occupies when gripped

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by the operator; in other words, the switch is in the on-position and current would be fed to the electric motor to drive the same. In this on-position the switch control mechanism compresses a spring 8 of sufficient strength to immediately turn the switch part 6 to off-position when the operator's grip is relaxed permitting handle 4 to fly upwardly. This type of control is more or less conventional but it will be seen that no control is given preventing coasting of the motor and connected parts after the current is turned off.

In order to prevent coasting of the motor armature 3 after the current has been turned off of the motor, the safety attachment A, previously referred to, is applied as a unit to the tool. The safety attachment, as clearly shown, consists of a base plate 10 to which is welded or otherwise secured sides 12. The base plate is provided with openings for reception of bolts 14 by means of which it may be secured to the frame of the tool B. An opening is also provided in the base plate through which a short shaft 16 extends, which shaft is adapted to be secured to a driven shaft 18 of the high speed tool. This driven shaft is preferably the armature shaft of the tool. As shown, the short shaft 16 has keyed thereto as at 20 a brake drum 22 held in place by nut 24. The brake drum is adapted to be gripped by a brake lining 26 fastened to a brake band 28 which in turn is fastened to short operating arms 30. One of the arms 30 has secured thereto a short piece of pipe 32 adapted to engage an anchor pin 34 fastened to the base plate. A strap 36 is also secured to the short piece of pipe and provided with an opening to receive the hooked end 38 of a spring 40, the opposite end of which is hooked into an opening 42 of the other brake operating arm. This spring is placed under tension and always tends to pull the operating arms together squeezing the brake lining against the brake drum. The moving operating arm 30 is adapted to rub against a plate or wedge block 44 fastened to the base plate by any suitable means such as machine screws 46. This wedge plate will during movement of the comparatively free brake operating arm toward brake release position cause the complete release of the brake band from the brake drum by shifting the free end toward the brake drum thereby causing the brake band to maintain a more nearly circular form in its released position. In this way riding of the released brake band on the drum is prevented.

In order to counteract the spring tension and provide control over the operation of the brake band, a cam finger 50 is formed on the upper end

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of an operating shaft 52 extending through the base plate and through a part of the tool casing to a point adjacent the switch part 6 previously referred to. The lower end of the operating shaft has secured thereto an arm 54, to the free end of which is attached as by bolt 56 a link 58. The free end of the link has attached thereto as by bolt 60 a bracket part 62 which can be welded or otherwise secured to the switch part 6. Wear of the brake lining 26 is compensated for by means of an adjusting bolt having a large square head 70 and a shank 72 having threaded engagement with the brake operating arm 30 and locked in position by lock nut 74. The casing housing the brake and operating parts is completed by means of the top cover plate 76 held in place by the bolts 14 and preferably provided with a handle part 78 permitting ready carrying of the tool. This handle part can in most cases be the original handle part of the tool.

From the preceding description it will be seen that the safety brake can be built up as a unit and applied to existing tools without any material or major change being necessary in the tool, nor will the operation of the tool be modified insofar as the operator is concerned. The operation of the safety brake is as follows, assuming the parts to be in the position shown in the figures, that is, with the lever 4 held down by the operator against springs 8 and 40 and with the switch part 6 in position to feed current to the motor. With the parts in this position the brake is released as shown in Fig. 2, that is, the cam finger 50 bears against the adjusting plate 70 forcing the operating arms apart and causing the one arm to slide along the wedge plate 44 and move toward the brake drum, thereby wholly releasing the brake band from the brake drum. If for any reason the operator relaxes his grip on the handle, the lever 4 will fly up due to the energy stored in springs 8 and 40. This will immediately shift the switch part 6 causing the operating shaft 52 to be rotated in a clockwise direction as viewed in Fig. 2. Such a rotation allows the operating arms to approach each other under the urge of the spring 40. Approach of the operating arms 30 will cause the brake lining 26 to grip the brake drum 22 and since the rotation of the brake drum is in a counter-clockwise direction as viewed in Fig. 2, the band tends to wrap and tightly grips the brake drum bringing it to an almost immediate stop yet without the shock which would be occasioned by a positive grip. It will thus be seen that no conscious effort is necessary on the part of the operator to stop the tool operation and such a condition is necessary to prevent accidents.

While the invention has been described more or less in detail, it will be obvious to persons skilled in the art that various modifications and rearrangements of parts may be made and all such modifications and rearrangements of parts are contemplated as will fall within the scope of the appended claims defining my invention.

What is claimed is:

1. As an article of manufacture for use with a portable tool controlled by a switch, a safety brake comprising, a housing adapted to be secured to the tool, a brake drum in the housing adapted to be connected to a rotating shaft of the tool, a brake band located in the housing and substantially encircling said brake drum, means anchoring one end of said brake band in the housing, a guide plate secured to the housing and adapted to be engaged by the other end of said

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brake band as said brake band is moved toward released position, said guide plate being so arranged as to move the free end of said brake band toward the brake drum during releasing movement of said band, resilient means constantly urging said brake band toward gripping engagement with said brake drum, a cam finger engaging a part of said band and cooperating with said guide plate to hold the brake band in released position and operating means for said cam finger.

2. A safety brake for a rotatable brake drum, said brake comprising a brake band anchored at one end and substantially encircling the brake drum, a guide plate engageable by the other end of said brake band and so arranged as to shift said other end of the band toward said brake drum during release of the brake, means constantly urging said brake band toward gripping engagement with said brake drum, means bearing on a part of said brake band and together with said guide plate normally preventing said gripping engagement, and operating means controlling said last named means to permit said gripping engagement.

3. A safety brake for a rotatable brake drum comprising, a substantially circular brake band anchored at one end and free at the other end, means constantly urging said brake band toward gripping engagement with the brake drum, and means counteracting said first named means and normally holding said brake band to its substantially circular form but out of engagement with the brake drum, said last named means including a wedge plate disposed in the path of movement of said free end of the brake band and so arranged as to cause said free end to shift toward the brake drum during release of the brake band.

4. A safety brake for high speed tools having a driving motor, said safety brake including a brake drum connected to the motor armature and rotatable thereby, a brake band anchored at one end and substantially encircling the brake drum, a guide plate engageable by the free end of said brake band and so arranged as to shift said free end of the brake band toward said brake drum when the brake is released, a spring constantly urging said brake band toward gripping engagement with said brake drum, a cam finger bearing on a part of said brake band and normally preventing said gripping engagement, and operating means controlling said cam finger to permit said gripping engagement.

5. A safety brake for high speed tools having a controlled driving motor, said safety brake including a brake drum connected to the motor and rotatable thereby, a brake band substantially encircling the brake drum, projecting ends attached to said brake band, anchor means for one of said projecting ends, a guide plate slidably engaged by the other projecting end and so arranged as to move said other end toward the brake drum when the brake band is in released position, a spring constantly urging said ends toward each other whereby said band may be brought into gripping engagement with said brake drum, a cam finger interposed between said projecting ends, said guide plate and cam finger normally preventing said gripping engagement of the band and drum, and operating means for said cam finger whereby said cam finger may be moved to permit said gripping engagement.

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