Nov. 29, 1932. P. A. SOLEM 1,889,040

POLISHING WHEEL

Filed Dec. 12, 1928

Fig. 1.

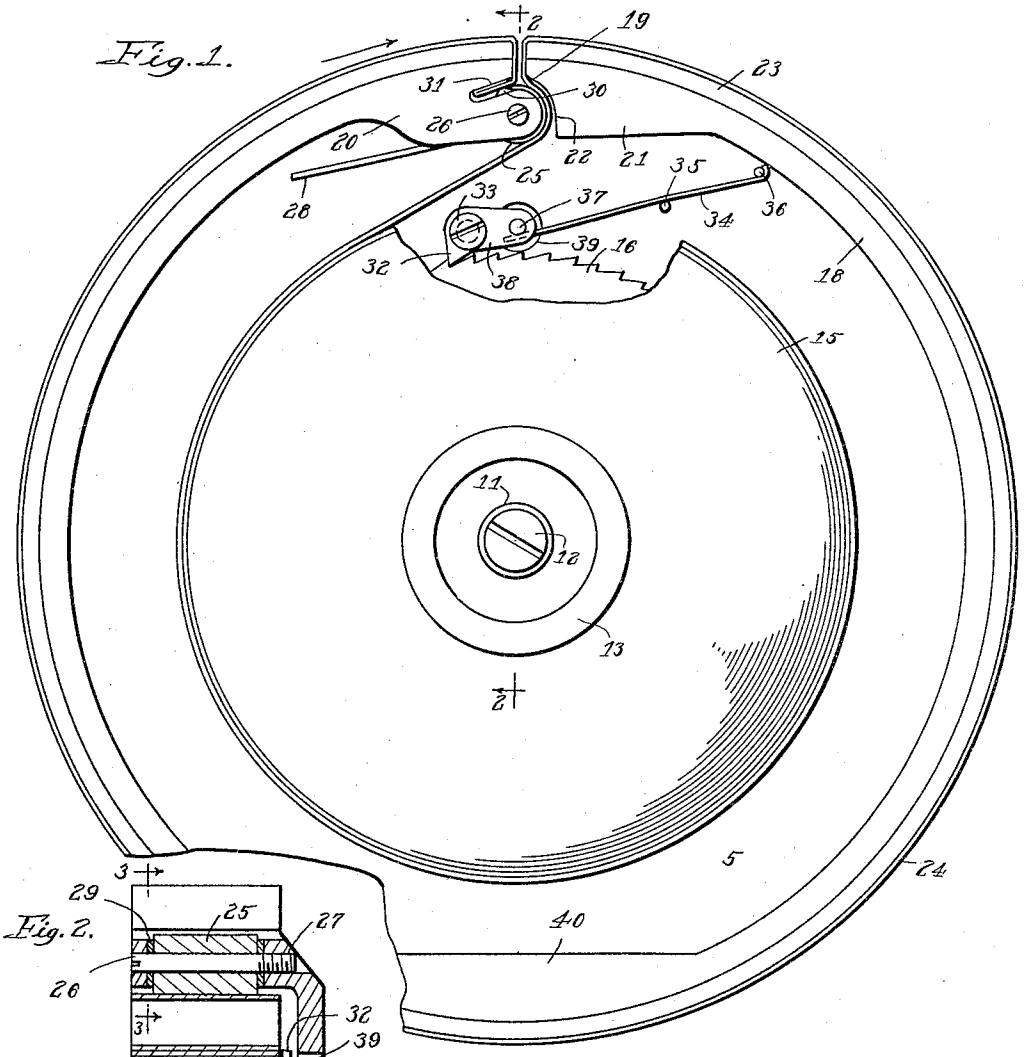


Fig. 2.

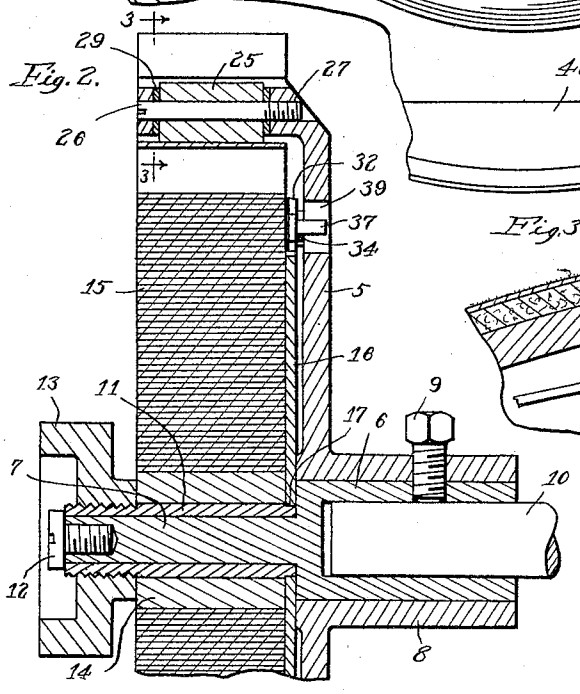
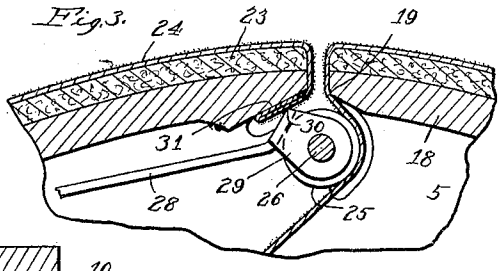


Fig. 3.



Inventor.
Peter A. Solem
By Wilson & McCanna
Attys.

Patented Nov. 29, 1932 1,889,040

UNITED STATES PATENT OFFICE

PETER A. SOLEM, OF ROCKFORD, ILLINOIS

POLISHING WHEEL

Application filed December 12, 1928. Serial No. 325,445.

This invention relates to polishing and abrading wheels such as are commonly used in machine shops and other places for the polishing of metal parts, the invention being, however, not limited to this particular kind of wheel, but contemplating generally all similar types of wheels or drums, the tape or web covering of which requires renewal from time to time.

In the use of the ordinary kind of polishing wheels, it is well known that there has been considerable waste of the abrasive tape occasioned partly by the fact that when a wheel had to be covered the workman tore off a strip from a roll, guessing at the required length. This meant wasting of the entire strip when it happened to be too short, or wasting of a part when it happened to be too long. There was also a certain amount of waste due to the fact that both free ends of the strip had to be used for the fastening thereof onto the wheel. Aside from this serious objection, there was also the objection that these wheels usually had more or less impractical means for fastening the tape thereon so that considerable time was wasted in the removal and replacement of a worn out tape.

The principal objects of my invention are, therefore:

First, to provide a polishing wheel having a roll of abrasive tape arranged to be mounted thereon inside the rim so that the tape can be withdrawn directly from the roll through a slot in the rim and applied to the latter, thus eliminating all guess-work in the matter of the taking of tape off the roll and the consequent wasting of tape, while at the same time facilitating the matter of replacing worn out tape because of the handiness of the roll, and

Second, to provide means at one side of the slot in the rim of the wheel for clamping the free end of the tape thereto, and means for mounting the roll of tape on the wheel in such a way that the same can be turned relative to the wheel to tighten the tape on the rim and can be locked in adjusted position so as to turn with the wheel in the normal operation thereof. With this arrangement, the worn out tape can be removed and replaced in much less time than was otherwise required, and no tools are needed; the whole operation can be done by hand.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is a side view of a polishing wheel embodying my invention;

Fig. 2 is a section taken on the line 2—2 of Fig. 1, and

Fig. 3 is an enlarged sectional detail taken on the line 3—3 of Fig. 2.

The same reference numerals are applied to corresponding parts throughout the views.

The wheel 5 has a hollow enlarged end 6 of a spindle 7 held assembled in the hub 8 thereof by a set screw 9, which also serves to fasten the wheel removably on a suitable drive spindle 10 arranged to fit within the hollow end 6 of the spindle 7. A sleeve 11 is rotatably received on the reduced projecting end of the spindle 7 and retained by means of a cap screw 12. A hand nut 13, suitably knurled on the periphery thereof to facilitate turning by hand, is threaded on the outer end of the sleeve 11, and serves to clamp the wooden spool 14, forming the core of a roll 15 of abrasive tape or web. The sleeve 11 is made of the proper size to fit the standard sized spool. A ratchet wheel 16 has a press fit on the slightly reduced inner end 17 of the sleeve 11 and, when the nut 13 is tightened, the spool 14 is clamped in place between it and the ratchet wheel. In other words, the roll of tape will then turn with the hand nut 13 and ratchet wheel 16, further reference to which will be made presently. The threads on the sleeve 11 are left handed so that the nut 13 can be turned to the left, as viewed in Fig. 1, without unthreading, the said nut being arranged in the turning of the roll to tighten and clamp the spool 14 tighter and tighter, the more the roll is turned, and the tape placed under tension.

The roll 15, it will be observed, fits inside the rim 18 of the wheel and is, therefore, entirely out of the way so far as any likelihood of interfering with the operation of the wheel is concerned, the roll being furthermore arranged to turn with the wheel, as will pres-

ently appear. The wheel is cast with a slot 19 in the rim thereof adjacent reinforcing webs 20 and 21 preferably cast integral with the rim, between which a channel 22 communicating with the slot 19, is formed to permit the extension of the tape directly from the roll through the slot 19 to be threaded about the periphery of the rim over the usual felt padding 23, to form a covering indicated by the numeral 24. Enough tape is, of course, reeled off the roll to reach entirely around the rim with enough to spare to be entered into the slot for fastening, as shown in Fig. 1. I prefer to fold the free end to double thickness in the manner shown to guard against tearing of the tape when the end is clamped, as will now be described. In the threading of the tape through the slot 19, it is passed around a roller 25 mounted on a pin 26 suitably threaded in place, as indicated at 27. A clamping lever 28 is pivotally mounted on the pin 26 by means of lugs 29 formed integral with the end thereof and received on the pin with the roller 25 fitting snugly therebetween. Now, the folded end of the tape is arranged to be entered between the end 30 of the lever 28 and an inclined surface 31 formed on the inside of the rim 18 adjacent the slot 19, and when the lever 28 is swung in a clockwise direction, as viewed in Figs. 1 and 3, the end of the tape is arranged to be clamped between the end 30 of the lever and the surface 31 in a manner which is believed to be self evident. The ratchet wheel 16 has a pawl 32 engaging the periphery thereof, as shown in Fig. 1, and pivotally mounted on a screw 33 threaded in the side wall of the wheel 5. The pawl is held in engagement with the ratchet by a spring wire 34 bearing intermediate its ends on a pin 35 mounted on the side wall of the wheel 5 and having one free end hooked on another pin 36 also mounted in the side wall of the wheel. The free end of the wire 34 bears against a pin 37 projecting laterally from the arm 38 provided on the pawl 32 and into a hole 39 provided in the side wall of the wheel 5. Thus, when the free end of the tape is clamped to the rim of the wheel, the tape is stretched tightly about the rim by simply turning the roll with respect to the wheel by means of the nut 13 in a counter-clockwise direction, as the same is viewed in Fig. 1, the pawl 32 serving by engagement with the ratchet 16 to hold the roll firmly in adjusted position so that the roll turns with the wheel.

In operation, when the abrasive tape covering on the wheel has worn to such an extent that new tape is required, the lever 28 is simply moved by hand in a counterclockwise direction to release the end of the tape. Then a certain amount of tape is reeled off the roll 15 while the pawl 32 is held out of engagement with the ratchet 16, this being done by finger pressure on the pin 37 in the hole 39. The worn out tape is, of course, torn off and thrown away. Enough tape is withdrawn to make it easy to fold the free end and enter the same through the slot 19 to be clamped by the lever 28. When the end of the tape is properly fastened, the roll 15 can be turned in a counterclockwise direction by means of the hand nut 13 to take up the slack, it being advisable in the application of the tape to draw the hand across the same away from the clamped end to be sure that all of the slack is taken out, the slack being thus brought up to the slot 19, from which place it can be easily taken up by turning of the roll. In other words, it would not be feasible to expect to take up all of the slack by mere tightening of the roll itself, inasmuch as there is too much resistance to the drawing of the tape afforded by the felt padding underneath it, and the only way to make certain of a snug fit is to iron out the slackness by hand in the manner referred to. The tightening of the tape tends to turn the lever 28 in a clockwise direction, as viewed in Fig. 3, and thus the end of the tape tends to be clamped still more tightly. In the operation of the wheel, the same is arranged to turn in the direction indicated by the arrow in Fig. 1. This results in a pull on the tape away from the clamped end and causes the clamping lever 28 to clamp the end tighter and tighter the longer the tape is used, the end 30 of the clamping lever being caused to bind more and more because of the pull on the tape. If, after the tape has seen service for awhile, there is evidence of a certain amount of slackness, it will be evident that the slack can be taken up without the slightest difficulty by simply turning the roll 15 the equivalent of a notch or so of the ratchet wheel 16 in a counter-clockwise direction. Another factor that accounts for the lever 28 tending to clamp the tape tighter is the centrifugal force acting on the free end of the lever in the turning of the wheel, this force tending to turn the lever in a clockwise direction and hence clamp the end of the tape still more tightly. The great saving in tape realized in the use of a polishing wheel made in accordance with my invention should certainly be evident from the foregoing description. It might be stated that about the only waste in a whole roll of tape will be a length equivalent to the distance from the spool 14 to the rim 18 of the wheel when the end of the tape is reached. In passing, attention may be called to the counterweight 40 which may be cast integral on the inside of the rim 18 to compensate for the weight of the reinforcing webs 20 and 21 and the clamping lever and such other parts as the roller 25, pawl 32, etc., to the end that the wheel will run smoothly and not cause uneven wear in the drive spindle bearings.

It is believed that the foregoing descrip-

tion conveys a good understanding of my invention and of its various objects and advantages. While reference has been made herein to various specific details of construction and arrangement, it should be understood that the invention is not particularly limited thereto. Furthermore, changes may be made in size and proportion as may be found suitable for different purposes. For example, while the present device, by reason of the width of the rim thereof, is arranged to employ an abrasive tape, it will be evident that wheels or drums might be made using a web covering. All modifications and adaptations are, therefore, to be construed as properly coming within the spirit and scope of the appended claims.

I claim:

1. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a spindle at the center of the wheel, a roll of abrasive or equivalent material being adapted to be disposed inside the rim of said wheel about the spindle and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end being arranged to be entered into the slot, means for clamping the free end of said material against withdrawal from the slot in the rim, a sleeve rotatably mounted on the spindle and having the central spool of said roll fitting thereon, a ratchet wheel on the inner end of said sleeve disposed between the inside of the roll and the adjacent wall of said wheel, a pawl mounted on the last mentioned wall behind the roll and cooperating with the periphery of said ratchet wheel to hold the same against turning in one direction, said pawl being releasable manually from the other side of said wall, and a hand nut threading on the outer end of said sleeve to confine and clamp the spool of said roll between it and the ratchet wheel, said nut being arranged to be turned to turn the roll in a certain direction relative to the wheel to take up slack in the material on the rim and place the same under tension, and the threads of said nut and sleeve being such that the nut tends to tighten in that operation.

2. In combination an abrading or polishing wheel or drum having a slot in the rim thereof, a spindle at the center of the wheel, a roll of abrasive or equivalent material being adapted to be disposed inside the rim about said spindle and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end being arranged to be entered into the slot, means on the rim of said wheel for clamping the free end of said material against withdrawal from said slot, this arrangement permitting of the insertion of a roll of abrasive material of almost the diameter inside the rim of said wheel, said roll being arranged to be turned in a certain direction relative to the wheel to take up slack in the material on the rim and place the same under tension, and means between the inner side of the roll and the back wall of the wheel for releasably holding the roll against turning in the opposite direction, said means being releasable from the other side of said wall.

3. In combination an abrading or polishing wheel or drum having a substantially radial slot in the rim thereof, a roll of abrasive or equivalent material being adapted to be mounted inside the rim and arranged preferably coaxially with respect to the wheel and to have the material extended therefrom through the slot and wound about the outside of the rim, a pintle mounted on said wheel inside the rim adjacent the slot and substantially parallel to the axis of said wheel, a roller rotatably mounted on said pintle and having the material extended around one side thereof in passing from the roll outwardly through the slot, said roller being of ample diameter to avoid abrupt bending of the material, the rim having an inclined surface on the inside thereof extending from one side of the slot on the opposite side of the roller and in a predetermined spaced relation to said pintle wherein the free end of said material is arranged to be clamped, and a clamping lever pivotally mounted on said pintle at opposite ends of the roller and having an intermediate portion arranged in the turning of said lever to approach said inclined surface, whereby to clamp the end of said material thereon.

4. A structure as set forth in claim 3 wherein the clamping lever has a laterally reaching arm permitting easy manual operation thereof in the clamping and releasing of said material, the said arm being extended in such a direction with reference to the pintle that the centrifugal force active thereon in the turning of the wheel tends to turn the lever about the pintle in the proper direction to increase the clamping effect produced by the lever.

5. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a roll of abrasive material being adapted to be mounted inside the rim and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end being arranged to be entered into the slot, means for clamping the free end of said material, means providing a mounting for the roll at the center of the wheel, the said roll being arranged to be turned relative to the wheel to take up slack in the material on the rim and place the same under tension, a ratchet wheel arranged to be turned with the roll, said ratchet wheel being disposed between the roll and the back wall of the wheel, and a pawl mounted on said wall and engaging the periphery of said

ratchet wheel, said pawl normally having engagement with the ratchet wheel and having a part extending therefrom into an opening provided in the aforesaid wall whereby to permit release of said pawl from the other side of said wall.

6. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a roll of abrasive or equivalent material being adapted to be mounted inside the rim and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, means for holding the roll against turning, the free end of said material being arranged to be entered into the slot, and means for clamping the free end of said material against withdrawal from the slot, said means comprising a pintle mounted on said wheel inside the rim adjacent the slot and substantially parallel with the axis of said wheel, said rim having an inclined surface provided thereon extending from one side of the slot wherein the end of the material is arranged to be clamped, the said surface being in a predetermined spaced relation to said pintle, and a lever pivotally mounted on said pintle and having a clamping portion at a predetermined radius with respect to said pintle arranged in the turning of said lever to approach said surface to clamp the material thereon, and said lever having a laterally reaching arm permitting easy manual operation of said lever in the clamping and releasing of said lever, said arm extending in such a direction with respect to the pintle that the centrifugal force active on said lever in the turning of the wheel tends to turn the lever in the proper direction to increase the clamping effect.

7. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a roll of abrasive or equivalent material being adapted to be mounted inside the rim and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end of the material being arranged to be entered into the slot, means for clamping the free end of said material against withdrawal from the slot in the rim, a projection on said wheel centrally disposed with respect to the rim, a sleeve rotatably mounted on said projection and adapted to serve as a mounting for the center spool of said roll, an enlarged nut threading on the outer end of said sleeve to hold the roll thereon, said nut serving as a handle to turn the roll relative to the wheel to take up slack in the material on the rim and place the same under tension, the threads of said nut and sleeve being such that the nut tends to tighten in that operation, and means for fixing the roll to the wheel in adjusted condition so as to keep the material under tension.

8. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a roll of abrasive or equivalent material being adapted to be mounted inside the rim and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end being arranged to be entered into the slot, means for clamping the free end of said material against withdrawal from the slot in the rim, a sleeve mounted coaxially on the wheel serving as a mounting for the central spool of said roll, a hand nut threading on the outer end of said sleeve serving to clamp the spool and arranged to be turned to turn the roll in a certain direction relative to the wheel to take up any slack in the material on the rim and place the material under tension, a ratchet on the inner end of said sleeve arranged to be turned relative to the wheel with the roll, the said spool being arranged to be clamped between the nut and ratchet on said sleeve, the threads of said nut and sleeve being such that the nut tightens as the roll is turned thereby, so that the farther the roll is turned the more tightly the spool is clamped by the nut, and a pawl mounted on the wheel and engaging the ratchet arranged to hold the roll against turning back under the tension of the material.

9. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a roll of abrasive or equivalent material being adapted to dispose inside the rim of said wheel and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end of the material being arranged to be entered into the slot, means for clamping the free end of said material against withdrawal from the slot in the rim, a projection on said wheel centrally disposed with respect to the rim, a sleeve rotatably mounted on said projection and having the central spool of said roll fitting thereon, means on the outer end of said projection for holding the sleeve in place thereon, an enlarged nut arranged to thread onto the outer end of said sleeve to hold the spool in place thereon, the last mentioned means being of such a form as to permit the nut to pass over the same in threading onto or off from the sleeve, whereby to permit placing or removing the spool with the sleeve in position on said projection, said nut serving as a handle for turning the roll to take up slack in the material on the rim and place the same under tension, the threads of said nut and sleeve being such that the nut tends to tighten in that operation, and means for fixing the roll to the wheel in adjusted condition so as to keep the material under tension.

10. In combination, an abrading or polishing wheel or drum having a slot in the rim thereof, a roll of abrasive or equivalent material being adapted to be disposed inside the

rim of said wheel and arranged to have the material extended therefrom through the slot and wound about the outside of the rim, the free end being arranged to be entered into the slot, means on the wheel for supporting the roll thereon in such a way that the roll may be turned to take up slack in the material on the rim and place it under tension, means for holding the roll in adjusted position to keep the material under tension, a pintle mounted on said wheel inside the rim adjacent the slot and substantially parallel to the axis of said wheel, the rim having an inclined surface on the inside thereof extending inwardly from one side of the slot and in a predetermined spaced relation to said pintle, the free end of the material being arranged to be clamped on said surface, a clamping lever pivotally mounted on said pintle having a clamping portion arranged in the turning of said lever to approach the inclined surface to clamp the end of said material thereon, and a roller also mounted on said pintle and having the material extended around one side thereof in passing from the roll outwardly through the slot, said roller having frictional engagement with the lever whereby in the turning of the roll to tighten the material the roller is turned and tends to turn the lever toward clamping position.

In witness of the foregoing I affix my signature.

PETER A. SOLEM.