

Jan. 31, 1939.

H. R. HERCHENRIDER

2,145,418

ROLL FOR GRINDING AND POLISHING

Filed Oct. 30, 1937

2 Sheets-Sheet 1

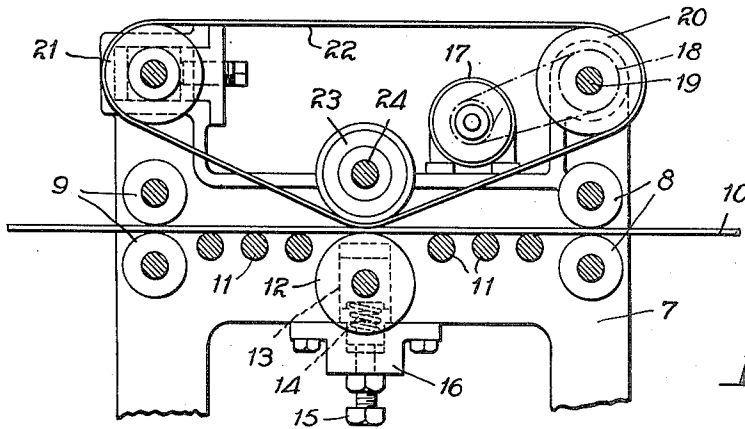


Fig. 1.

Fig. 2.

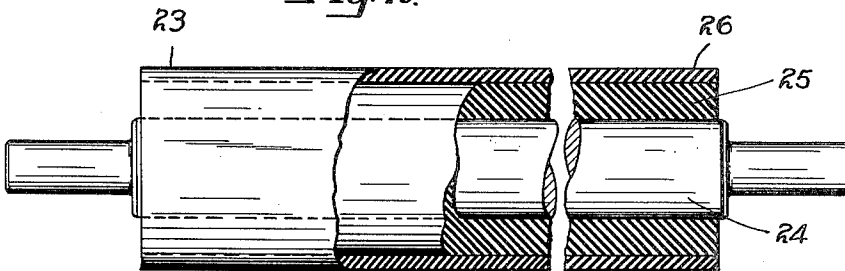


Fig. 3.

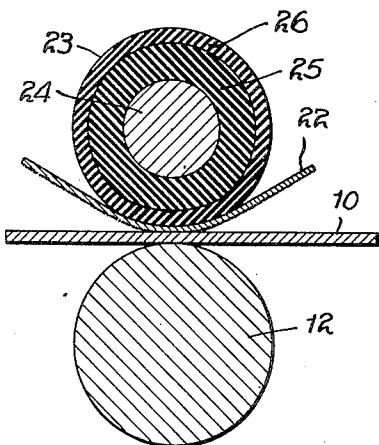


Fig. 4.

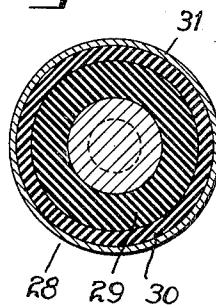
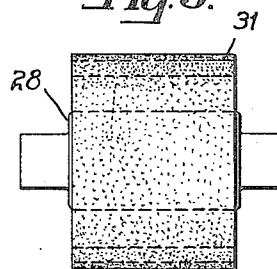


Fig. 5.



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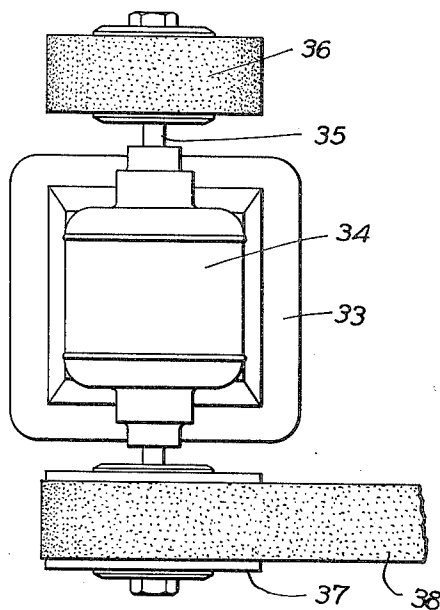


Fig. 6.

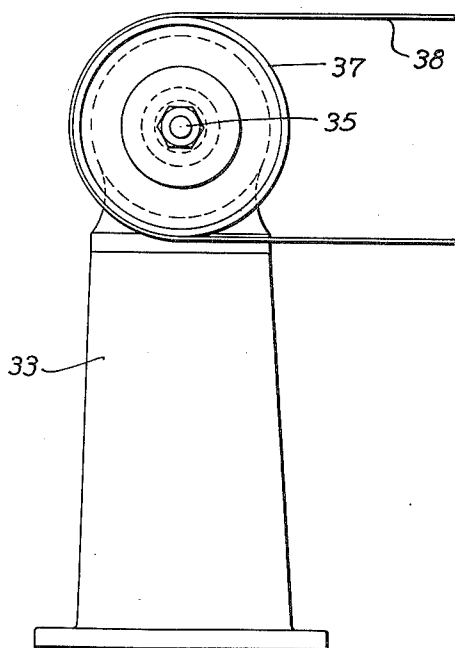
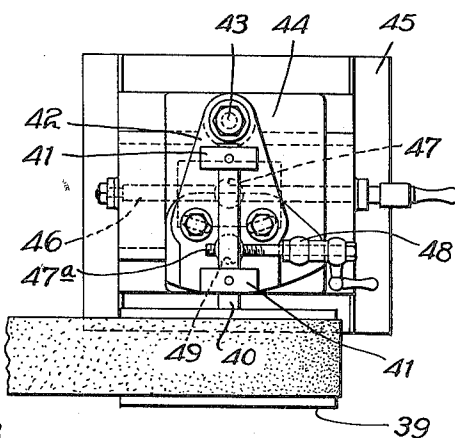
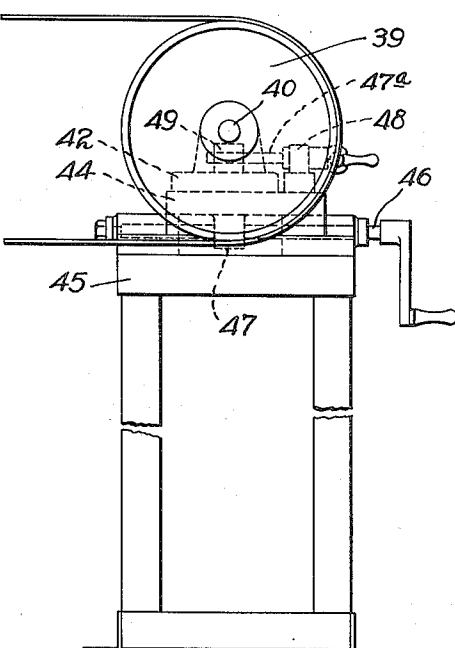


Fig. 7.



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UNITED STATES PATENT OFFICE

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ROLL FOR GRINDING AND POLISHING

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ware

Application October 30, 1937, Serial No. 171,982

3 Claims. (Cl. 51-141)

My invention relates to grinding and polishing apparatus, and more particularly to an improved form of roll, wheel or drum, employed for bringing the abrasive into contact with the metal sheets or other material being ground or polished.

In structures of this character if a hard roll is employed, there is such rigidity as will result in the grains of abrasive being torn from the surface of the grinding roll, or from the abrasive belt where the roll is used to back up or press the belt against the material being ground, and there may be excessive cutting of the material by the larger grains of abrasive. Also, in those cases where the abrasive is carried upon the periphery of a hard roll, "chattering" of the roll occurs on the work. On the other hand, if a soft-surfaced roll is employed, the abrasive grains will be pushed backwardly into or toward the roll, and not make proper contact with the work.

One object of my invention is to provide a roll of such construction that the surface thereof can recede somewhat from the material being operated upon by the abrasive, thus avoiding "chattering" and permitting it to maintain proper contact with the work, but which will, nevertheless, be of such hardness that the abrasive grains cannot in effect recede into or tend to be pushed into an embedded relation with the surface of the roll during contact with the work.

The invention is particularly useful in connection with the grinding and polishing of steel strips and sheets, but it is also susceptible of use in the grinding and polishing of other materials. Broadly stated, the invention embodies a presser or abrasive roll mounted on a shaft and having a core of soft material, such as soft rubber, surrounding which is a cylindrical outer portion of somewhat harder material which may carry the abrasive or may serve as a presser or backing-up roll for an abrasive-carrying belt.

Heretofore attempts have been made to use soft presser rolls for backing up sanding belts, but the yieldability of the roll prevents the application of effective grinding pressure. Where hard rolls have been employed, the roll will not "give" sufficiently to permit the abrasive belt to be maintained in proper contact with non-planular objects. By using a roll whose body is yieldable but whose surface is relatively harder, I avoid the objections to the use of either all-hard or all-soft rolls when employed to back up a sanding belt.

Some of the forms which my invention may take are shown in the accompanying drawings wherein Figure 1 is a longitudinal sectional view

through a grinding and polishing machine; Fig. 2 is a sectional view, on an enlarged scale, of the presser roll of Fig. 1; Fig. 3 is a sectional view on an enlarged scale of the presser roll and the billy roll or supporting roll of Fig. 1, together with an abrading belt and a sheet of metal being operated upon; Fig. 4 is a sectional view through a modified form of roll; Fig. 5 is a face view thereof; Fig. 6 is a view showing the use of my roll on a standard type of grinding stand, but with an abrasive belt, and Fig. 7 is a side view thereof.

Referring first to Figs. 1 to 3, I show a framework 7 having guide rolls or driven feed rolls 8 and 9 through which, or by which, a metal sheet 10 is advanced across supporting rollers 11 and a billy roll or main supporting roll 12. The roll 12 is supported at its ends in vertically-movable guide bearings 13 which are normally urged upwardly by springs 14 supported upon the upper ends of adjusting screws 15, at the ends of the roll, the screws 15 each having threaded engagement with a bracket 16 secured to the framework 7. A table can be substituted for the rollers 11 and 12 if desired.

A driving motor 17 is mounted in the upper part of the frame 7 and has driving connection with a pulley 18 which is mounted on a shaft 19 that also carries a belt-driving drum 20. A pulley or sheave 21 is journaled in the framework at the other end of the machine, and an abrasive belt 22 passes around the drums 20 and 21 and is driven by the drum 20. The belt 22 may be surfaced with any gritty material such as silicon carbide, aluminum oxide, sand, emery, garnet, polishing rouge, etc.

Also journaled in the frame of the machine is a presser roller 23 which maintains the belt 22 in engagement with the sheet being ground. This roll is provided with a shaft 24 which may have idle rotation, simply by the drag or pull of the belt 22, or may be independently driven, to assist in driving the abrasive belt. A soft core 25 is vulcanized or otherwise secured to the shaft 24, and a sheath 26 of harder material is secured to the core 25, as by vulcanizing. The core 25 may be of soft rubber or other suitable yieldable material, having a durometer gauge hardness of about 20° to 50°. The sheath 26 is of a harder material such as rubber, having a durometer gauge hardness of 25° to 90°. It could also suitably be of cork. For rough grinding work, the sheath 26 should have a hardness of 65° to 90°, while for a polishing or finishing operation I prefer to use a sheath having a hardness of 25° to 65° durometer gauge read-

ing. The durometer gauge is such as employed for testing the hardness of rubber.

The apparatus can be employed for grinding strip or sheet steel throughout the entire surface thereof, or employed for grinding out or polishing limited areas which are rough or discolored. The use of a roll having a yieldable or soft core permits the roll to yield when uneven thickness of material is encountered, either through variation in the sheet 10 or in the belt 22. At the same time, the hardened sheath 26 provides such rigidity as to maintain proper grinding and polishing contact with the sheet-metal or other material being operated upon.

In Figs. 4 and 5 I show a roll 28 that has its body portion composed of a soft rubber core 29 and a somewhat harder sheath 30, as in the case of the roll 23 above described. In this instance, however, abrasive is provided directly on the face or periphery of the roll, by embedding granular or abrasive particles in the roll surface, or by applying thereto a canvas sleeve 31 to which the abrasive particles are glued. In this case, the roll will have direct engagement with the work, instead of serving as a presser roll for an abrasive belt. The composite soft and hard construction of the roll when employed in this manner, possesses the advantages above recited for the presser roll in connection with the abrasive belt, and is also desirable for use in direct contact with the work, because the yieldable or cushion core thereof prevents chattering such as usually occurs when a hard abrasive-carrying roll is brought into contact with work.

In Figs. 6 and 7 I show a polishing roll stand which in its conventional form ordinarily has a motor-driven shaft upon one end of which is mounted a rough-grinding wheel and upon the other end a finish-grinding or polishing wheel. In the form shown, an abrasive belt and my improved roll are substituted for the finish-grinding roll. The polishing stand is indicated by the numeral 33 and carries a motor 34 whose shaft 35 has on one end thereof a grinding or polishing roll or wheel 36 which may be of the form shown in Fig. 4 or of other construction. On the other end of the shaft is a soft-core roll or wheel 37 such as shown in Figs. 2 and 3,

around which passes an abrasive belt 38 that functions after the manner of the belt 22.

The belt passes also around an idler pulley 39 whose shaft 40 is journaled in a bearing 41 carried on a plate 42 which is supported by and pivotally connected at 43 to a slide 44. The slide 44 is mounted on a stand 45, for adjustment toward and from the stand 33. An adjusting screw 46 is journaled in the stand 45 and has screw-threaded engagement with a stud 47 that projects downwardly from the slide 44, whereby the belt tension can be adjusted. Angular adjustment of the shaft 40 relative to the shaft 33 is effected by an adjusting screw 47a which is journaled in a boss 48 on the slide 44 and has screw-threaded engagement with a boss 49 on the bearing plate 42.

The work to be ground or polished will be brought into engagement with the belt 38 at points where it has engagement with the roll 37.

In the appended claims, the term "roll" is employed in a broad sense, to include wheels, drums, etc.

I claim as my invention:

1. A grinding and polishing machine comprising an abrasive belt, means for moving said belt, and a presser roll for holding said belt against materials being ground or polished, during movement of the belt, the said roll having a cylindrical sheath of compressible and resilient material supported by a core of softer resilient material.

2. A grinding and polishing machine comprising an abrasive belt, a pair of wheels around which the belt passes, and means for driving one of the wheels, one of the wheels having a core of resilient material and a cylindrical sheath of compressible material having less resilience than the core and serving to resist the pressure of work applied against the belt at said wheel.

3. A grinding and polishing machine comprising a flexible abrasive strip, means for moving said strip, and a presser roll for holding said strip against materials being ground or polished, during movement of the strip, the said roll having a cylindrical sheath of compressible and resilient materials supported by a core of softer resilient material.

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