To all whom it may concern:

Be it known that I, Cyra B. Wattles, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Grinding or Polishing Wheels, of which the following is a specification.

This invention has reference to an improvement in grinding or polishing wheels or rolls, and more particularly to an improvement in that form of grinding or polishing wheels to which is detachably secured a flexible covering of abrasive or polishing material, such as paper or cloth, the outer surface of which is covered with sand, emery or corundum for grinding, or a material such as pile fabric for polishing.

The object of my invention is to improve the construction of a grinding or polishing wheel or roll, whereby an abrasive or polishing material is detachably secured to the peripheral surface of the wheel or roll under spring tension, is firmly held mechanically and by frictional contact, and is easily and quickly detached when required, a spring tension mechanism automatically taking up the slack in the abrasive or polishing material caused by the same coming into contact with the work, thereby keeping a constant tension on the abrasive or polishing material.

A further object of my invention is to secure the ends of a flexible abrasive material to a wheel or roll in a position for the end to extend through a slot in the wheel or roll and overlap, thus bringing the abrasive surface of the material into frictional contact, thereby materially assisting the spring tension mechanism in holding the abrasive material on the wheel or roll.

My invention consists in the peculiar and novel construction of a grinding or polishing wheel or roll whereby a flexible abrasive material is detachably secured to the peripheral surface of the wheel or roll by a spring tension mechanism, and by overlapping the ends of the abrasive material whereby bringing the abrasive surface of the material into frictional contact, with details of construction, as will be more fully set forth hereinafter.

Figure 1 is a face view of my improved grinding or polishing wheel, showing a strip of flexible grinding material secured to the face of the same. Fig. 2 is an end view of the wheel, showing the end plate partly broken away to show the counterbalanced portion. Fig. 3 is an enlarged sectional view taken on line 3-3 of Fig. 2, showing the construction of the tension mechanism and the detachable tool for setting the same. Fig. 4 is a detail sectional view taken on line 4-4 of Fig. 3, showing the position the tension mechanism would assume in holding the overlapping ends of the abrasive material in frictional contact. Fig. 5 is a detail sectional view similar to Fig. 4, showing a modified form of means for holding the overlapping ends of the abrasive material. Fig. 6 is a detail sectional view similar to Fig. 4, showing a still further modified form of means for holding the overlapping ends of the abrasive material. Fig. 7 is an enlarged detail view of the end of the arm in the tension mechanism, showing the means for securing one end of the abrasive material to the arm, and Fig. 8 is an enlarged perspective view of one end of the abrasive material.

In the drawings, a indicates a shaft, b a cylindrical wheel, c a spring tension mechanism, d a detachable tool for setting the spring tension mechanism, and e a strip of flexible abrasive material secured to the peripheral surface of the wheel b by the tension mechanism c. The shaft a is supported in suitable bearings and revolved at a high rate of speed by any usual means. The wheel b is constructed to have the central hub b' secured to the shaft a in any well known way, the closed end b″, the peripheral flange b′ in the face of which is the slot b′ on a line with the shaft a, the flange b″ thickened on its inner face adjacent the slot b′ forming the cross rib b′ with the semi-circular concave face b′ merging into the edge of the slot b′, the opening b″ formed centrally with the slot b′ in the edge of the end b″, the inwardly-extending boss b' in which is the hole b' on the end b″, and a thickened counterweighted portion b' on the flange b' opposite the slot b′ all formed integral, as shown in Figs. 2, 3 and 4. A circular end plate b″ having the central hole b″ for the shaft a, the off set hole b'″, the hole b'″, the semi-circular slot b′″ and the opening b′″ formed in the edge of the
plate $b^1$, is secured to the edge of the flange $b$ by screws in a position for the hole $b^1$ to coincide with the hole $b^2$ in the boss $b^2$ and for the opening $b^3$ to coincide with the opening $b'$ in the end $b''$, as shown in Figs. 2 and 3.

The spring tension mechanism $c$ consists of a stud $c'$ secured to the boss $b'$ in the hole $b^2$ by riveting and having the central hole $c''$ in its opposite end, a rectangular pivoted member $c'$ having the central hub $c''$ in which the hole $c''$ for the stud $c'$, the oppositely-disposed flat arms $c''$ and $c''$ extending outwardly from the hub and approxi-

mately the interior width of the wheel. The outer arm $c'$ is constructed to have a circular hole $c''$ in the end extending through the width of the arms and merging into a narrow slot $c''$ which extends from the hole $c''$ through the end of the arm, as shown in dotted lines in Fig. 3 and in full lines in Fig. 7. A spring $c^{10}$ is secured at one end to the end $b'$ of the wheel. This spring extends around the boss $b'$ and is secured at its other end to the arm $c'$, the tension of the spring tending to move the arm $c'$ to the right or toward the rib $b'$. A stop pin $c^{15}$ is secured to the end $b''$ of the wheel in a position for the arm $c'$ to engage with it and limit the setting movement of the pivoted member $c''$ against the tension of the spring $c^{15}$. The stud $c''$ extends through the hole $c''$ in the pivoted member $c''$ and through the hole $b^{14}$ in the end plate $b^{14}$ flush with the outer surface of the plate, as shown in Fig. 3.

The tool $d$ consists of a lever $d'$ having the fulcrum pin $d^2$, the pin $d^2$ and the spring actuated pin $d^2$ in a position for actuating pin $d^2$ to enter the hole $c''$ in the end of the stud $c'$, the pin $d^2$ to engage with the arm $c''$ on the side of the rib $b'$ through the slot $b^{14}$ in the end plate $b^{14}$ and for the spring actuated pin $d^2$ to enter the off-set hole $b^{14}$ in the end plate $b^{14}$ in setting the spring tension mechanism.

The abrasive material $e$ consists of a strip of paper or cloth covered on one surface with an abrasive substance such as sand, emery, or curundum, and having the flat end $e'$ and the enlarged and strengthened end $e''$. This end $e''$ is formed from the material or by folding a strip of sheet metal over the end of the abrasive material, as shown in dotted lines in Fig. 8, and then folding the first fold over, as shown in full lines in Fig. 8.

In the operation of applying the abrasive material to the wheel $b$, the end of the arm $c'$ is brought under the slot $b'$ by partly rotating the tool $d$ until the spring actuated pin $d^2$ snaps into the hole $b^{14}$. The arm $c'$ is now held in its set position against the tension of the spring $c^{15}$. The enlarged end $e'$ of the abrasive material $e$ is now inserted side-wise into the hole $c''$ in the end of the arm $c''$ through either of the openings $b'$ or $b''$ and the slot $b''$ with the abrasive surface on the outside. The strip of abrasive material is now carried around the peripheral surface of the wheel on the flange $b'$ and the flat end $e'$ bent or folded under through the slot $b'$ onto the semi-circular concave surface $b''$ of the rib $b''$. The tool $d$ is now removed. The tension of the spring $c^{10}$ moves the arm $c'$ toward the rib $b''$ and brings the abrasive surface of the material into frictional contact, as shown in Fig. 4, thus securing into the abrasive material on the wheel. The wheel revolves at a high rate of speed in the direction of the arrows, as shown in Figs. 2 and 4. If the abrasive material should become slack by contact with the work, the tension of the spring $c^{10}$ on the arm $c'$ will take up the slack, as required.

In the modified form, as shown in Fig. 5, the flat end $e'$ of the abrasive material is inserted first and held on the rib $b'$ by a spring clip $c^3$. This clip is secured to the rib $b'$ and may have teeth to assist in holding the end of the abrasive material between the clip and the rib and is opened to receive the same by inserting a tool through the hole $b^{14}$ in the flange $b'$ and pressing in on the clip.

In the modified form, as shown in Fig. 6, both ends of the abrasive material are constructed as shown in Fig. 5. A circular hole $b^{15}$ is formed in the rib $b'$ which merges into a narrow slot $b^{15}$ which extends from the hole through the concave semi-circular surface $b''$ and the end of the abrasive material corresponding to the end $e'$ is secured in the same.

As shown in both of the modified forms the abrasive surface of the material is brought into frictional contact, thus materially assisting in holding the same on the wheel.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A grinding or polishing wheel having a slot in the peripheral surface, a strip of flexible abrasive material supported on the peripheral surface 'of the wheel in position for the ends to extend through the slot and overlap, and means for automatically exerting a tension on one end of the abrasive material, whereby the ends of the material are brought into frictional contact and the slack of the material is taken up.

2. In a grinding or polishing wheel, means for detachably securing a strip of flexible abrasive material on the peripheral surface of the wheel in a position for the ends of the material to overlap, means for automatically bringing the two ends into frictional contact and exerting a spring tension on one end to take up the slack.
3. In a grinding or polishing wheel, means for detachably securing a strip of flexible abrasive material at one end to the wheel in a position for the ends of the material to overlap, and means for automatically exerting a spring tension on one end to take up the slack.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CYRA B. WATTLES.

Witnesses:

Ada E. Hagerty,
J. A. Miller.