

(No Model.)

2 Sheets—Sheet 1.

F. L. LANE & H. J. MITCHELL.
ABRADING CYLINDER.

No. 577,582.

Patented Feb. 23, 1897.

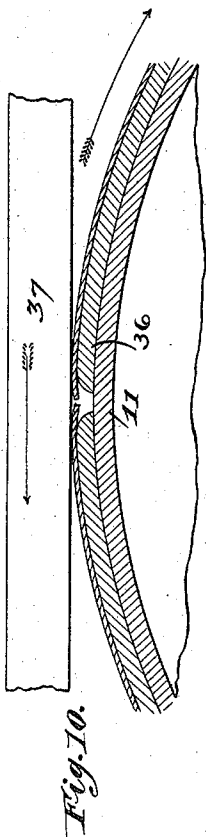
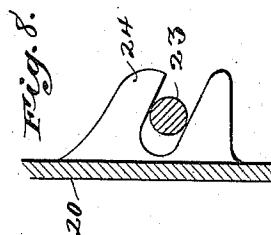
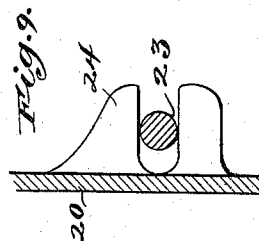
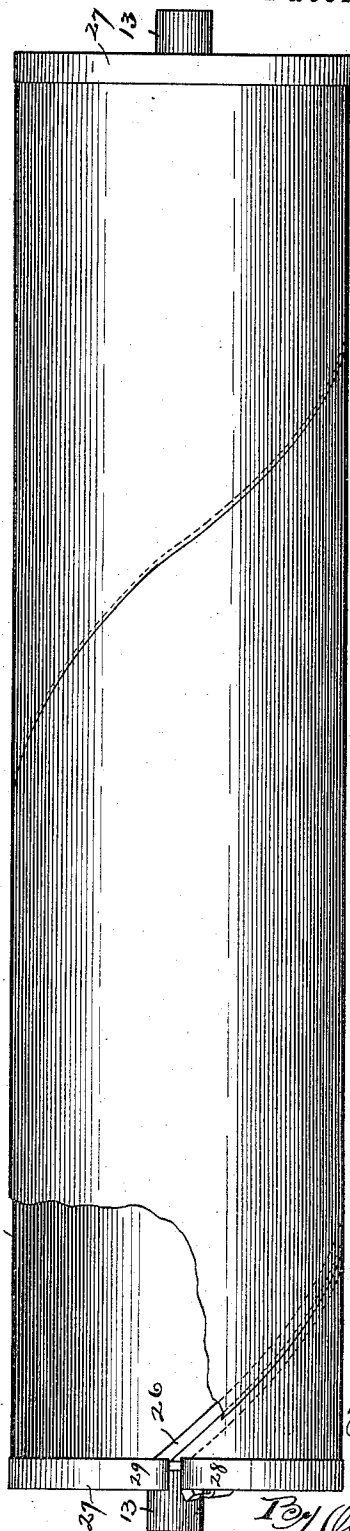


Fig. 1.



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By *Offield & Co. Lithographers*

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

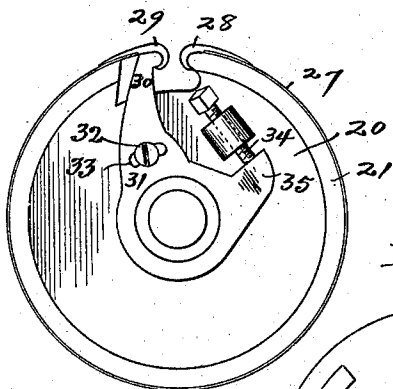


Fig. 3.

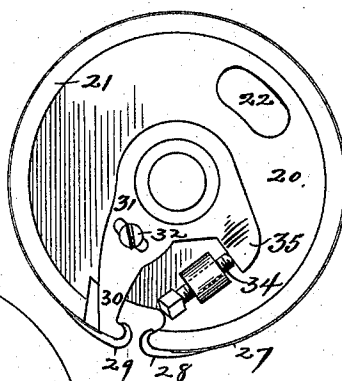


Fig. 6.

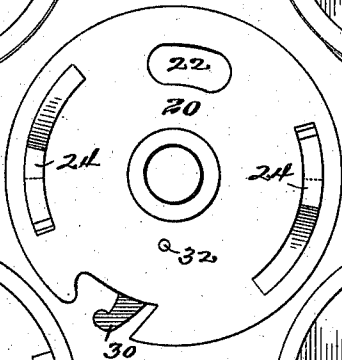


Fig. 4.

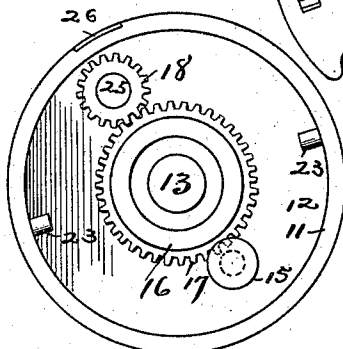


Fig. 5.

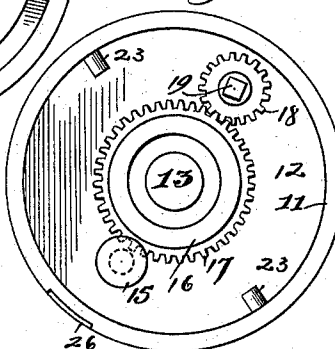
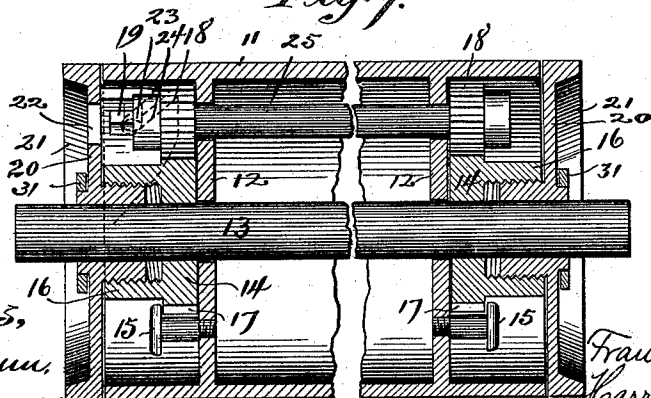


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANKLIN L. LANE AND HARRISON J. MITCHELL, OF BELOIT, WISCONSIN,
ASSIGNORS TO THE BERLIN MACHINE WORKS, OF SAME PLACE.

ABRADING-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 577,582, dated February 23, 1897.

Application filed May 22, 1896. Serial No. 592,633. (No model.)

To all whom it may concern:

Be it known that we, FRANKLIN L. LANE and HARRISON J. MITCHELL, of Beloit, Wisconsin, have invented certain new and useful Improvements in Abrading-Cylinders, of which the following is a specification.

This invention relates to certain improvements in abrading and polishing cylinders, and more particularly to a novel construction of the cylinder and to the manner of applying an abrading material thereto and to means for adjusting and tightening the abrading material upon the cylinder.

The object of our invention is to so construct an abrading-cylinder that the abrading material is uniformly and securely held upon the surface of the cylinder and a continuous, uniform, and even action of the cylinder upon the work thereby secured.

In carrying out our invention we employ a cylinder having a peripheral spiral groove, which may be formed in the shell or body of the cylinder or in a fabric or other cushion applied over and incasing the shell or body.

Upon this cylinder is wound the abrading material, preferably of one piece, the winding being spirally around the circumference of the cylinder, and the turns or joints of the spirals registering with the spiral groove.

The ends of the abrading material are allowed to project over or beyond the ends of the shell and are made fast to clamping-rings, preferably by means of a tape or band and by novel mechanisms hereinafter described.

The clamping-rings, or one of them, are capable of being turned slightly or given a partial rotation, and at the same time one or both of the clamping-rings may be moved longitudinally, thus reducing the diameter of the spirally-wound covering of abrading material and correspondingly elongating it, whereby the joint of the windings maintains the same position with reference to the groove of the cylinder.

In the accompanying drawings, Figure 1 is a plan view of the cylinder and clamping-rings, showing the projected ends of the shaft and the abrading material applied to the cylinder, a section of the material removed to expose the shell of the cylinder and the end of the groove therein and dotted lines indicating the path of the groove. Figs. 2 and 3

are elevations of the clamping-rings applied to the ends of the cylinder. Figs. 4 and 5 are elevations of the opposite ends of the cylinder with the clamping-rings removed. Fig. 6 is an elevation of the clamping-ring shown in Fig. 3, viewed from the opposite side. Fig. 7 is a longitudinal sectional elevation of the cylinder, the middle portion broken away. Figs. 8 and 9 are details showing a slot-and-pin connection of the clamping-rings with the cylinder. Fig. 10 is a transverse sectional view in detail through a portion of the shell of the cylinder with the fabric cushion applied thereto and showing the joint of the abrading material above the groove and the relation of the stock to the joint of the abrading material.

In the drawings, 11 represents the shell of the cylinder; 12, the cylinder-heads, the shell projecting beyond the heads in order to provide recesses to receive operating parts hereinafter described.

13 represents the cylinder-shaft, whose ends project to form journals.

14 represents sleeves applied over the ends of the shaft 13 and confined against the heads 12, as, for example, by means of the headed screw 15, which permits said sleeves to be turned upon the shaft. Said sleeves have interiorly-threaded bosses 16, said threads being, respectively, right and left hand threads at the opposite ends of the cylinder. The sleeves are also provided with exterior gear-teeth 17 and mesh with small pinions 18, one having a key-stud 19.

20 21 represent clamping rings or disks (shown in Figs. 2 and 3) and of similar construction, except that the one shown in Fig. 3 has an aperture 22, through which a key may be passed to engage the key-stud 19. Said clamping-rings have exteriorly-threaded hubs, which are sleeved over the projected ends of the shaft 13 and engage with the interior threaded bosses 16 of the sleeves 14. Said clamping-rings have flanged rims and are of the same diameter as the cylinder. Obviously the rotation of the key-stud will cause the rings, when held against rotation, to move longitudinally, and in order to guide said rings in their movement we prefer to employ pins 23 on the shell and projecting toward the shaft, with slotted lugs 24 formed

on the inner sides of the clamping-rings, the pins working in the slots. If the slot be oblique, as shown in Fig. 8, when the clamping-ring is moved outwardly it will at the same time be slightly turned axially or rotated about the shaft. If the slot be straight, as shown in Fig. 9, the clamping-ring will be moved outwardly or away from the cylinder in the direction of the axis of the cylinder, but without being turned upon its own axis. In order to move said clamping-rings simultaneously, the key-stud 19 may be formed upon the end of the shaft 25, extending longitudinally through the cylinder parallel to the shaft thereof and having bearings in the heads 12. By turning this shaft the clamping-rings at each end will be moved simultaneously and caused to approach or recede from each other, depending upon the direction of movement.

The surface of the cylinder is provided with a spiral groove 26.

The abrading material may be of paper, cloth, or of any othersuitable substance capable of being applied to the cutting, dressing, or polishing of wood, metal, or other surfaces. This abrading material is preferably applied in a single sheet cut of a suitable length to cover the surface of the cylinder and of such form that when spirally wound thereon the joint of the abrading material will follow the groove. Such joint may be overlapped, as indicated by the dotted line in Fig. 1, or, as in the modified construction shown in Fig. 10, the edges of the abrading material may be abutted or approximated, but without contact. The sheet of the abrading material is of such length that its ends project over the flanged rims of the clamping-rings and are secured thereto.

The preferred means for securing the projected ends of the abrading material to the clamping-rings comprise a strap, band, or tape, preferably of metal, (marked 27,) and having hooked ends 28 29. The rim of the clamping-ring is cut away at one point, thus making a shoulder over which the hook 28 engages and providing a space within which works the shouldered end 30 of a rocking arm 31, sleeved over a flanged hub of the clamping-ring 21 and confined to the clamping-ring by means of the set-screw 32 working in the slot 33. An adjusting-screw 34 bears against a lug 35 of the arm 31 and affords means for tightly drawing the clamping tape or band and thus securely clamping the abrading material to the clamping-ring. The abrading material being thus secured to the clamping-rings may be uniformly and evenly stretched over the surface of the cylinder by moving the clamping-rings by the means described, and this movement of the clamping-rings may either be longitudinal only or longitudinal and axial, depending upon the form of the slot for the pin or guide. In either case the movement of the clamping-rings reduces the diameter of the cylindric shell formed by the

abrading material and correspondingly elongates such cylindric shell, thereby uniformly and evenly stretching and tightening the abrading material upon the surface of the cylinder.

We prefer to employ a slot-and-pin connection, which will insure a slight rotative or axial movement of the clamping-ring in addition to its sliding movement, for the reason that when the clamping-ring is rotated the joint in the spirally-wound abrading material will not be changed in its relation to the groove, whereas if the movement were longitudinal only the sheet of abrading material would be stretched, but there would be a slight separation of the edges at the joint. In the construction shown in Fig. 10 the spiral groove is formed in a fabric cushion 36. A cylinder of this kind is commonly used as a finishing-cylinder, and we employ cylinders with a metal shell and cylinders with a fabric covering in the same machine, the former for roughing and the latter for finishing.

With the construction shown in Fig. 10 the edges of the abrading material may be abutted because the fabric cushion yields slightly to the strain of the abrading material and the edges of the latter will slightly curl into the groove, thus presenting no surfaces to catch upon the material (represented at 37) passing over the joint, as indicated in Fig. 10. In addition to the modifications above described we have contemplated and have actually employed several forms of construction of the cylinder itself. A single movable clamping-ring may be employed and the means for moving and locking said ring may be varied. Obviously other of the constructive features hereinbefore described may be varied, and our invention is not limited to the conjoint use of the several features of construction.

In the preferred embodiment of our invention we employ a spirally-grooved cylinder and so apply the abrading material thereto that the joint between the turns of the spirals coincide with the groove, whereby a clearance is provided beneath said joint into which the abutted or overlapped edges of the abrading material will be drawn when the abrading material is tensioned and thereby be prevented from catching upon the stock. The means for tightening the abrading material might be employed upon cylinders which are not provided with such spiral grooves.

We claim—

1. An abrading-cylinder having an abrading material spirally wound thereon, and a longitudinally-movable clamping-ring over which the abrading material projects, and to which it is secured, and by the movement whereof the abrading material may be tightened, substantially as described.

2. An abrading-cylinder having an abrading material spirally wound thereon, and a rotatably and longitudinally movable clamping-ring, over which the abrading material projects, and to which it is secured, and by

the movement whereof, the abrading material may be tightened upon the cylinder, substantially as described.

3. An abrading-cylinder having a spiral 5 groove in its periphery and an abrading material spirally wound thereon, the edges of the spirals registering with the spiral groove, substantially as described.

10 4. An abrading-cylinder having a spiral groove in its periphery, an abrading material spirally wound thereon with the edges of the spirals overlapped above the groove, substantially as described.

15 5. An abrading-cylinder having a spiral groove in its periphery, abrading material spirally wound thereon with its edges registering with the groove, and its ends adjustably secured, substantially as described.

20 6. An abrading-cylinder having a spiral groove in its periphery, an abrading material spirally wound thereon, the turns of the spirals registering with the groove, a movable clamping-ring over which the abrading material projects and to which it is secured, and 25 means for moving the clamping-ring, whereby to tighten the abrading material.

7. An abrading-cylinder having an abrading material covering the surface thereof, a clamping-ring over which the abrading material projects and a clamp, consisting of a flexible band or tape for clamping the abrading material to the ring, and means for tightening said tape, substantially as described. 30

8. An abrading-cylinder having an abrading material wound thereon, a clamping-ring over which the material projects, a clamp consisting of a flexible tape, strap or band having one end adapted for engagement with the clamping-ring and a rocking arm to which the 35 other end of the tape is made fast and means for moving said arm, whereby to tighten the tape, substantially as described.

9. An abrading-cylinder having an abrading material spirally wound thereon and projecting beyond the end of the cylinder, a clamping-ring, to the periphery of which the 45

projecting end of the abrading material is secured, said clamping-ring having a threaded connection with a part carried by the cylinder, capable of rotation, but held against longitudinal movement and means for rotating said part, whereby to longitudinally move the clamping-ring, substantially as described. 50

10. An abrading-cylinder having an abrading material spirally wound thereon, a clamping-ring to which one end of the abrading material is secured, a sleeve having a threaded engagement with the clamping-ring and confined against longitudinal movement and a pinion carried by the cylinder and adapted to 60 drive said sleeve, substantially as described.

11. An abrading-cylinder having an abrading material spirally wound thereon with its ends projecting beyond the ends of the cylinder, clamping-rings over which the ends of 65 the abrading material project and to which they are secured, said rings having threaded hubs, sleeves having threaded engagement with said hubs, said sleeves being adapted to rotate independently of the cylinder but held 70 from longitudinal movement, a shaft or rod passing through the cylinder and having pinions upon its ends for driving said sleeves and said shaft being adapted for rotation, whereby the clamping-rings may be simultaneously longitudinally moved, substantially 75 as described.

12. An abrading-cylinder having an abrading material spirally wound thereon and a shaft whose projected ends form journals for 80 the cylinder, clamping-rings adapted to slide upon the shaft, and to which rings the projecting ends of the abrading material are secured, and means for imparting a longitudinal and partially rotary movement to said 85 rings, substantially as and for the purpose described.

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