Aug. 31, 1954 E. E. STOUT 2,687,641

TEXTILE ABRASION MACHINE

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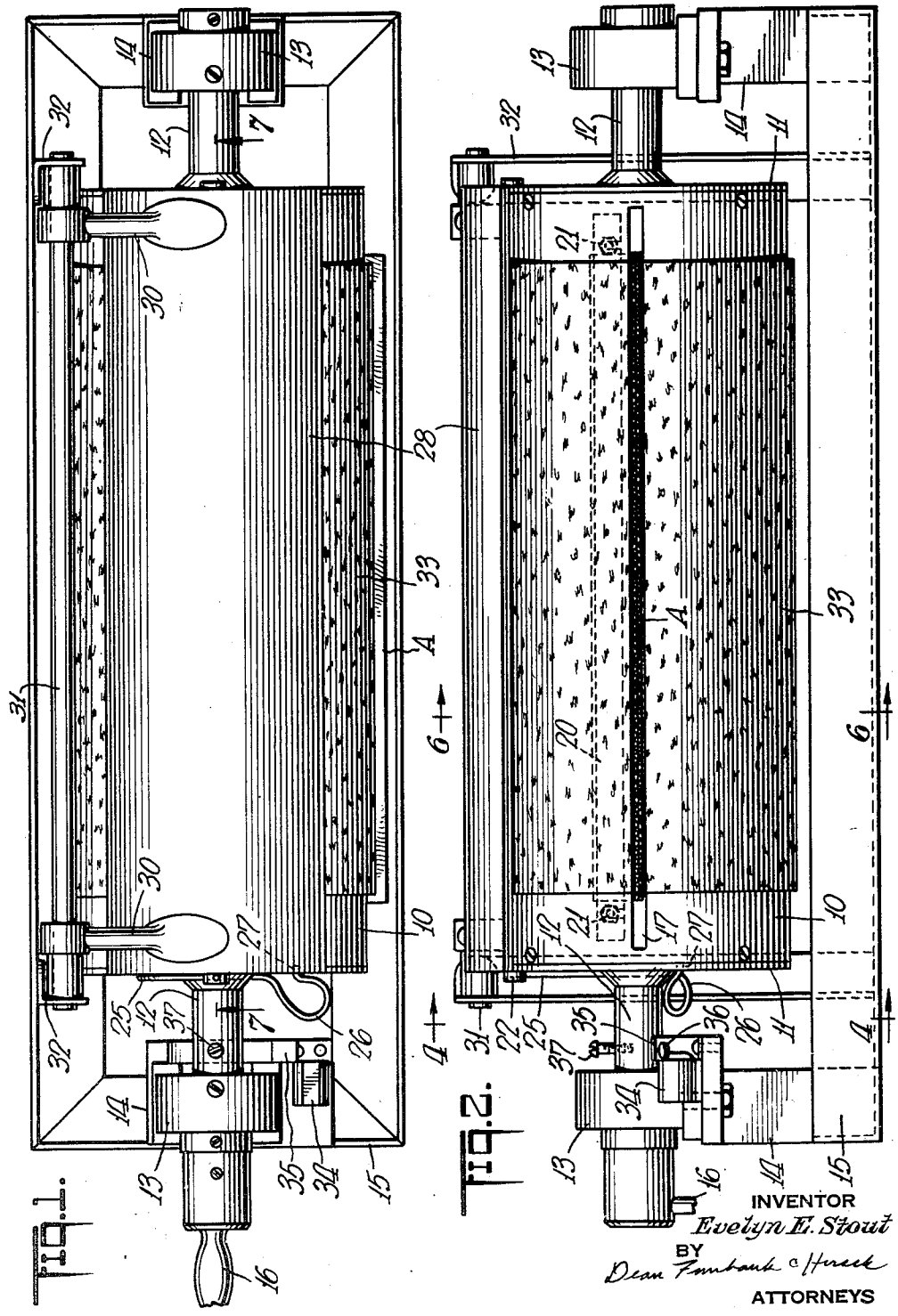


Fig. 1.

Fig. 2.

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FIG. 3.

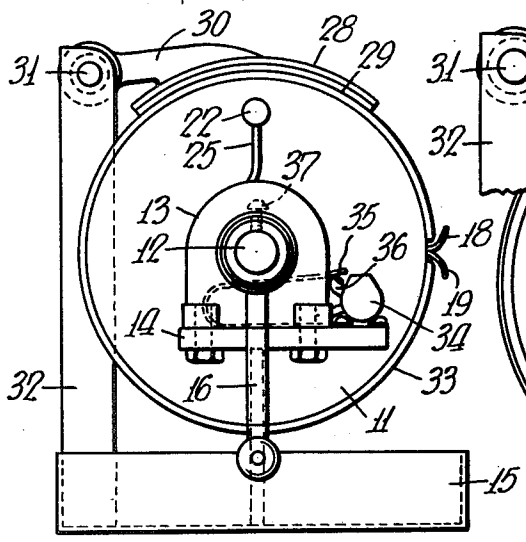


FIG. 4.

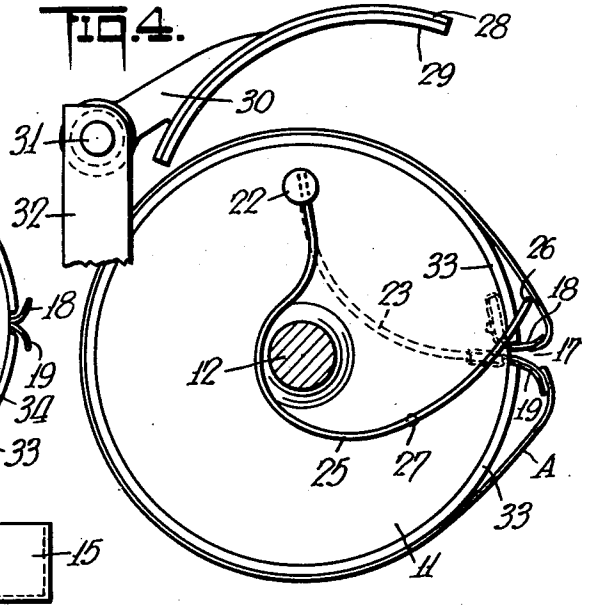


FIG. 5.

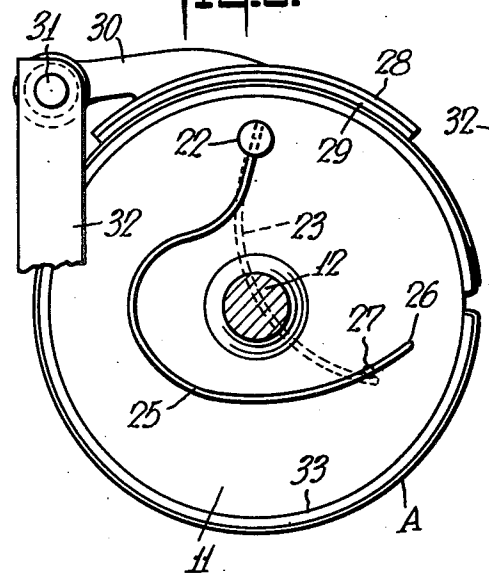
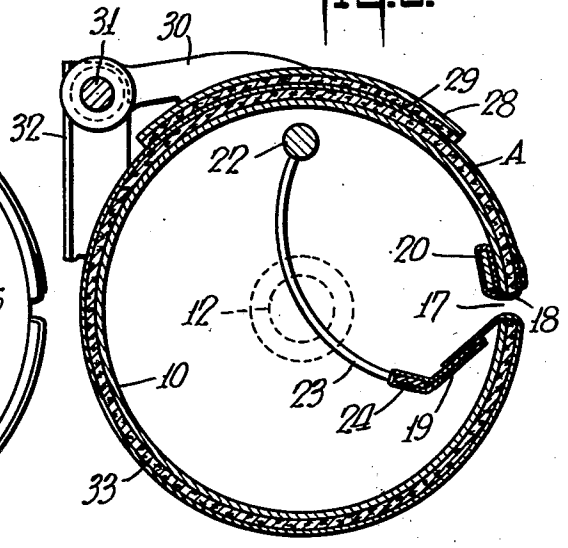


FIG. 6.



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Fig. 7.

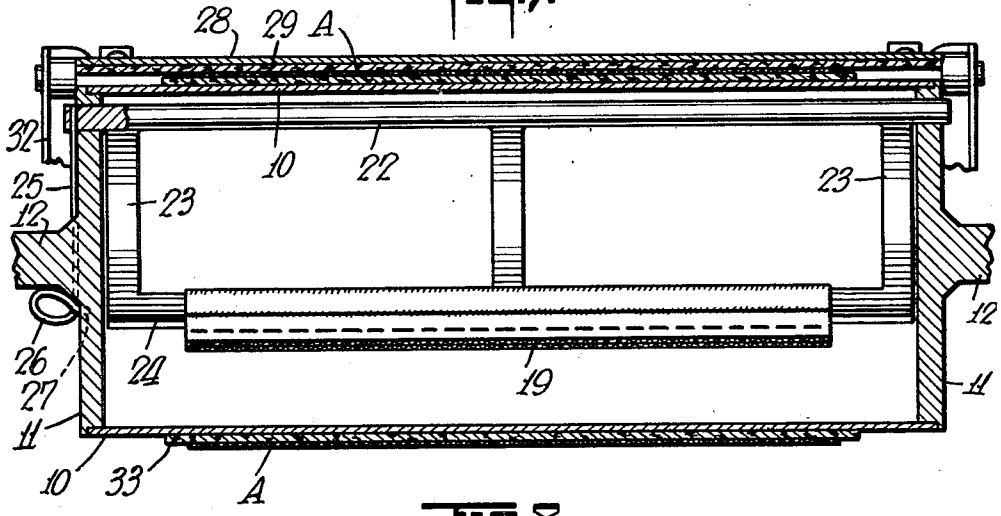
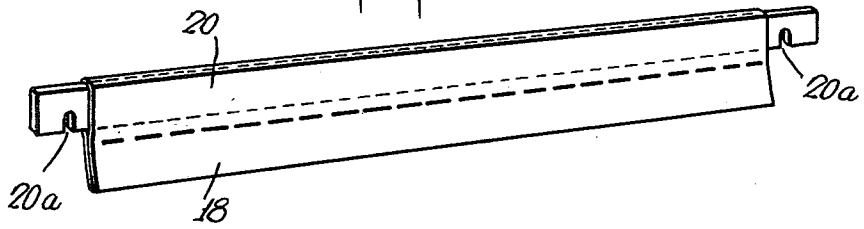


Fig. 8.



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TEXTILE ABRASION MACHINE

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Application November 23, 1951, Serial No. 257,824

14 Claims. (Cl. 73—7)

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This invention relates to apparatus for testing various types of fabrics to determine their wear resisting characteristics. It relates more particularly to that type of apparatus in which a sample of the fabric is attached to the periphery of a rotatable drum and an abrading or wear producing member is applied thereto as the drum is rotated.

By means of my improved apparatus one may abrade a large sample of the cloth; standard tests may be made on successive samples; the lint is thrown off; there is uniform wear on the whole sample, and the samples may be easily and quickly applied or removed.

As one feature of my invention there is provided novel means for detachably securing a sample of the cloth on the periphery of a drum and holding it smooth and under light tension while it is being tested.

As a further feature there are provided flexible strips to be detachably secured to the sample, and which extend through a longitudinal slot in the peripheral wall of the drum to hold the cloth smooth on the drum.

As a further feature, the fabric securing means includes a resilient part so as to produce the desired light tension on the fabric being tested.

As a further feature, the wearing action is produced by a member which is so supported that it may be easily and quickly moved into and out of operative position.

As a further feature, there is provided a counter for indicating the number of rotations of the drum, so that a plurality of different fabrics may all be tested under the same conditions.

Other important features will be hereinafter pointed out, or will be apparent from a consideration of the following description.

In the accompanying drawings there is illustrated merely one embodiment of my invention. In these drawings:

Fig. 1 is a top plan view of an apparatus embodying the invention.

Fig. 2 is a side elevation.

Fig. 3 is an end view, and showing a revolution counter.

Fig. 4 is a transverse section on the line 4—4 of Fig. 2, showing an end view of the drum, the abrading element being in raised position and the fabric loosely held.

Fig. 5 is a view similar to Fig. 4, but with the fabric held in stretched position on the drum and the abrading element in place.

Fig. 6 is a transverse section on the line 6—6 of Fig. 2, and with the parts in the positions shown in Fig. 5.

Fig. 7 is a longitudinal section on the line 7—7 of Fig. 1, and

Fig. 8 is a perspective view of one of the members used for securing the fabric in place.

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In the embodiment of the invention which is illustrated in the drawings there is provided a drum having a peripheral wall 10, preferably of steel or other sheet metal, and secured to the end walls 11 which may have axial sections 12 whereby the drum may be rotatably supported in bearings 13 on standards 14 at the end of the main frame, and rigid with the base 15. On one of the axial or shaft sections there may be provided any suitable means for rotating the drum. This is shown as a crank 16, but the drum might be rotated by a motor or any other source of power.

The peripheral wall 10 has a longitudinal slot 17, and means are provided within the drum for attachment to the opposite edges of a sheet of cloth A to be tested, and for holding the cloth smooth on the periphery of the drum, and under light tension. As shown, this means includes a pair of strips 18 and 19 of cloth or other flexible material, which may be basted or otherwise secured to the edges of the sheet of cloth A. The strip 18, as shown in Figs. 6 and 8, is secured to a metal bar 20 in any suitable way. As shown it is folded to form a loop which encircles the bar, and the latter is detachably secured to the inner surface of the drum and adjacent to the slot 17. The bar may have notches 20a in one edge adjacent to the ends thereof, and which may engage pins 21 on the inner surface of the drum adjacent to the slot 17. Thus the bar 20 and the strip 18 may be readily removed to facilitate the basting or otherwise securing of the edge of the strip to the cloth A to be tested.

Within the drum and adjacent to the peripheral wall there is provided a rock shaft 22 journaled in the end wall and having arms 23 adjacent to its ends and carrying a bar 24 to which the trailing edge of the strip 19 is secured. The rock shaft 22 extends through one of the end walls and has suitable means, such as a lever 25, for rotating it in the direction and to the extent required to apply high tension to the cloth being tested. The lever is preferably curved, as shown in Figs. 4 and 5, so that its movements are not interfered with by the adjacent axial sections 12 which support the drum, and it preferably has a loop portion 26 serving as a handle.

The lever 25 may be swung to the left from the position shown in Fig. 4 to the position shown in Fig. 5 to oscillate the rock shaft 22. At the same time the arm 23 will be swung to the left to apply tension to the strip 19 and hold the piece of fabric tightly on the surface of the drum. The lever 25 may be locked in position with the desired tension applied to the strip in any suitable manner. For instance, the end of the handle portion 26 may be turned at right angles and extended into a hole 27 in the adjacent end wall.

For testing the wearing characteristics of the cloth the frame has an arcuate shoe 28 having a liner 29 of abrading material, and connected by brackets 30 to a rock shaft 31 journaled in standards 32 at the ends of the frame. The shoe has its inner surface curved to follow for a substantial distance the outer surface of the cloth attached to the drum.

In the use of the apparatus, the lever 25 is moved to the position shown in Fig. 4, which permits the strips 18 and 19 to extend out through the slot 17, and the edges of these strips are basted or otherwise attached to the edges of the piece of cloth A which is to be tested. The lever 25 is then swung to the left from the position shown in Fig. 4 to the position shown in Fig. 5, and the end of the lever 25 is extended into the hole 27 so as to hold the cloth taut and in snug engagement with the periphery of the drum 10. Preferably the fabric does not directly engage the drum, but the drum has an outer layer of cork or other resilient material 33.

With the cloth thus secured in position, and under light tension, the shoe 28 is lowered to bring the abrading liner 29 into contact with the cloth. The drum is then rotated through a predetermined number of revolutions, and by means of the crank 16. In order to secure similarity of operations on different pieces of cloth there is preferably provided means whereby the number of revolutions is recorded. As shown in Fig. 3, the outer frame of the machine may have a counter 34, and a spring lever 35 may be secured to the frame and engage and operate a counter lever 36 once during each rotation of the drum. The shaft 12 may have a cam 37 thereon so as to depress the lever 35 and operate the counter once during each rotation of the drum.

It will be understood that the amount of abrasion for each test may be requlated by the roughness of the abradent on the shoe 28, and the number of revolutions of the drum. With these constant, comparative tests may be made on a large number of samples of different kinds of cloth.

Any lint produced by the testing operation and adhering to the fabric will be thrown off by the rotation of the drum.

It will be understood that the apparatus above described is merely one embodiment of my invention, and that various changes may be made in the details of construction and arrangement of parts without departing from the scope of the invention.

Having thus described my invention what I claim as new and desired to secure by Letters Patent is:

1. A machine for testing the abrasion resisting properties of a textile fabric, including a drum on the periphery of which the fabric is positioned, said drum having a longitudinal slot in the peripheral wall, means within said drum for anchoring one edge of the fabric, separate resilient means within said drum for applying tension to the opposite edge of the fabric to hold it in place on the drum, and an abrading member for acting on the fabric.

2. A machine for testing the abrasion resisting properties of a textile fabric, including a drum having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for securing the edges of the fabric to said bars, means for effecting relative movement of said bars to put the fabric under tension around the drum, and an abrading member movable toward and from the periphery of the drum.

3. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for effecting relative movement of said bars to apply tension to the fabric, and an abrading member for acting on the fabric.

4. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for detachably holding one bar in position adjacent to said slot, means for applying a resilient pressure to the other bar to hold the fabric under tension on the drum, and an abrading member for acting on the fabric.

5. A machine for testing the abrasion resisting properties of a textile fabric, including a drum having a resilient outer surface and a longitudinal slot, and around which drum the fabric to be tested is positioned, a pair of bars within said drum adjacent to said slot, flexible members connecting said bars to the opposite edges of the fabric, means for effecting relative movement of said bars to apply tension to the fabric encircling said drum, and an abrading element movable toward and from the drum.

6. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a slot for receiving the opposite edges of the fabric, an abrading element movable toward and from the periphery of the drum, means within said drum for anchoring one edge of the fabric, a rock shaft carried by and extending lengthwise of said drum and eccentrically positioned, an arm within said drum, connected to said rock shaft and connectable to one edge of the fabric, and a resilient lever outside of said drum and connected to said shaft for rotating the latter and thereby applying tension to the fabric.

7. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a slot for receiving the opposite edges of the fabric, an abrading element movable toward and from the periphery of the drum, means within said drum for anchoring one edge of the fabric, a rock shaft carried by and extending lengthwise of said drum and eccentrically positioned, an arm within said drum, connected to said rock shaft and connectable to one edge of the fabric, a resilient lever outside of said drum and connected to said shaft for rotating the latter and thereby applying tension to the fabric, and means for locking said lever in position to hold the fabric under tension.

8. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and hav-

ing a slot for receiving the opposite edges of the fabric, an abrading element movable toward and from the periphery of the drum, means within said drum for anchoring one edge of the fabric, a rock shaft carried by and extending lengthwise of said drum and eccentrically positioned, an arm within said drum, connected to said rock shaft and connectable to one edge of the fabric, a resilient lever outside of said drum and connected to said shaft for rotating the latter and thereby applying tension to the fabric, and means for counting the number of revolutions of the drum.

9. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for detachably holding one bar in position adjacent to said slot, a resilient arm for applying pressure to the other bar to hold the fabric under tension on the drum, and an abrading member for acting on the fabric.

10. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for detachably holding one bar in position adjacent to said slot, a resilient arm for applying pressure to the other bar to hold the fabric under tension on the drum, means on the end of the drum for locking said arm in position to hold the fabric under tension, and an abrading member for acting on the fabric.

11. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for detachably holding one bar in position adjacent to said slot, a resilient arm for applying pressure to the other bar to hold the fabric under tension on the drum, said arm having a terminal portion engageable in a hole in the end of the drum to hold the fabric under tension, and an abrading member for acting on the fabric.

12. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for detachably holding one bar in position adjacent to said slot, a resilient arm for applying pressure to the other bar to hold the fabric under tension on the drum, said arm having a terminal portion engageable in a hole in the end of the drum to hold the fabric under tension, a loop portion serving as a handle, and an abrading member for acting on the fabric.

13. A machine for testing the abrasion resisting properties of a textile fabric, including a drum on the periphery of which the fabric is positioned, said drum having a longitudinal slot in the peripheral wall, means within said drum for anchoring one edge of the fabric, resilient means within said drum and connected to the opposite edge of the fabric to hold it in place on the drum and under tension, an abrading member for acting on the fabric, and a counter showing the number of revolutions of the drum.

14. A machine for testing the abrasion resisting properties of a textile fabric, including a drum around which the fabric is positioned, and having a longitudinal slot, a pair of bars within said drum and adjacent to said slot, means for attaching the opposite edges of the fabric to said bars, means for detachably holding one bar in position adjacent to said slot, means for applying a resilient pressure to the other bar to hold the fabric under tension on the drum, a counter for recording the number of revolutions of the drum, and an abrading member for acting on the fabric.

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