July 13, 1943. J. G. SHELLEY 2,324,050

ROLL

Filed Oct. 28, 1941

Fig. 1.

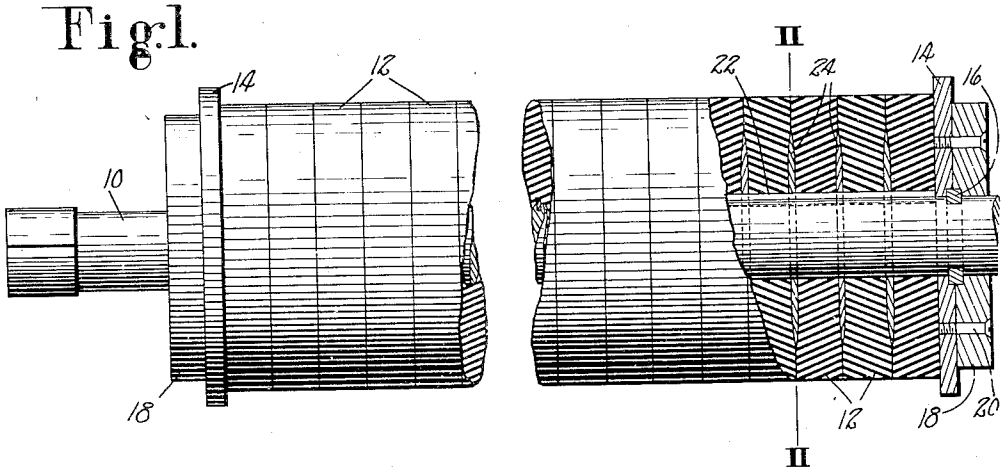


Fig. 2.

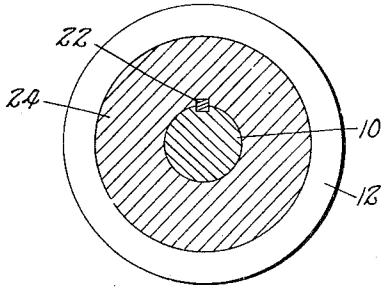
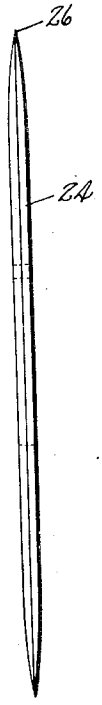


Fig. 3.



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ROLL

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2 Claims. (Cl. 68—127)

This invention relates to sectional rolls, and more particularly to rolls of the type used for wool scouring although it should be understood that the invention is applicable to sectional rolls adapted for other purposes.

In the scouring of wool, the material is passed between a pair of rolls held together under heavy pressure, at least one of these rolls having a yieldable surface to accommodate varying thicknesses of the wool as it passes between the rolls, and at the same time to permit an even pressure on the wool throughout the entire length of the roll. The roll having the yieldable surface is commonly made of rubber, although other materials having similar characteristics may be employed. To facilitate manufacture of the rolls, which are often more than four feet in length, as well as to permit ready replacement of portions of the roll which may become damaged, it is customary to make the resilient work-engaging surface of the roll of a plurality of annular sections or rings, these being mounted on the shaft of the roll. In order to insure passage of the material between the rolls, it is necessary to anchor the individual sections to the shaft so that they will not slip around the shaft relatively to one another. While the shaft may be provided with a key cooperating with keyways in the sections, other means must also be provided to prevent slippage which may occur by reason of the resiliency of the sections. This resiliency will permit at least some relative movement between the rings around the shaft thus straining the material at the keyways which results in eventual breakage of the sections. For this reason, if no additional provision is made to prevent slippage between the sections, the roll is generally unsatisfactory and short lived.

This difficulty has been overcome by keying to the shaft driving members in the form of castings between each pair of sections, the sections being hollowed out in their central portions to accommodate and fit the castings. The castings and the adjacent surfaces of the sections are formed to provide a positive gripping action between the sides of the castings and the sections. While the use of such castings overcomes the disadvantages set forth above, it produces other undesirable results. The depth of the compressible material above the castings is not uniform inasmuch as the castings are not of uniform diameter, so that the compressibility of the roll is not uniform throughout its length. This uneven compressibility of the material of which the sections are formed produces strains during the operation of the roll, particularly at the points where the section engages the periphery or largest diameter of the casting. After the roll has been in use for a period of time, the strains set up by the uneven compression of the parts of each section will cause the sections to break up, thus necessitating their replacement. This often occurs after the roll has been in use only a few weeks.

It has been proposed, in order to overcome the disadvantages of the construction described above, to substitute for the castings thin discs having small projections struck from their sides to enter the sections and grip them. The sections are recessed to accommodate the discs, which are keyed to the shaft. This arrangement has not been found satisfactory for the reason that during inward compression of the sections the projections tend to tear or gouge the material, leading to rapid destruction of the sections. While this arrangement tends partially to overcome the disadvantage of uneven compressibility of the surface of the roll, it does not overcome it entirely inasmuch as small portions of each section overlie the adjoining discs, at which points damage occurs to the sections within a short period of time. It has accordingly been found that these discs, while permitting more uniform compression of the roll, cause the roll to break down after a short period of use.

It is an object of the present invention to provide a sectional roll of the type referred to above having driving means for preventing slippage between the various sections, this means being so constructed that it cannot damage the individual sections of the roll while in operation, and permits uniform compressibility of the roll throughout its entire length.

To this end, and in accordance with a feature of the invention, the various sections of the roll are separated at their central portions by spacer members in the form of thin, smooth-surfaced discs which are keyed to the shaft of the roll. These spacer members may be made of metal, although other materials may be employed. By making these spacer members thin, it is unnecessary to cut or recess the sides of the sections to accommodate them. The sections, after they are mounted on the roll shaft, are placed under heavy axial compression, and I have found that thin, smooth-surfaced circular discs are as effective, by reason of the friction between the discs and the sections, after the roll has been assembled and the sections placed under axial compression, as any other form of spacer mem-

bers, in preventing slippage between the sections when the roll is placed in service. By forming the edges of the discs very thin, as by grinding them to an edge, the sections may compress inwardly throughout their entire depths relatively to the discs when the sections are placed under radial compression, and no part of the discs opposes radial compression of the adjacent surfaces of the adjoining sections. Accordingly, there is no tendency for the faces of the sections to become torn or otherwise damaged during the use of the roll which would shorten its useful life. Furthermore, the discs permit substantially uniform compression of all sections of the roll along its length thus increasing its effectiveness.

These and other features of the invention will now be described in detail in the following specification and illustrated in the drawing in which,

Fig. 1 is a view, partly in section, of one form of sectional roll constructed in accordance with my invention;

Fig. 2 is a section taken of the line II—II of Fig. 1; and

Fig. 3 is an end view on a larger scale than Figs. 1 and 2 of one of the discs.

As illustrated herein, the roll comprises a shaft 10 on which are mounted a plurality of annular sections 12 of a resilient compressible material such as rubber or a rubber compound, although other materials having similar characteristics may be employed. The sections are held on the roll under axial compression between end plates 14 which are held against endwise movement on the shaft in any suitable manner, as by split rings 16. Cover plates 18 may be secured by screws 20 to the end plates 14 to lock the split rings in place.

Secured to the shaft by means of a key 22 are a plurality of driving means in the form of thin flat discs 24 of smaller diameter than the sections 12. The discs terminate a sufficient distance inwardly of the sections so that they never come in contact with the stock passing between the rolls. Each disc is interposed between a pair of sections which are also keyed to the shaft by the key 22. The sides of the discs are preferably flat and smooth as illustrated, but after the sections have been assembled on the shaft and placed under axial compression, the coefficient of friction between the discs and the sections is sufficiently high to prevent any circumferential slippage between the sections and the discs during operation of the roll. The peripheries of the discs are ground or otherwise formed to present a narrow edge past which the adjacent portions of the sections may move freely in response to an inward or radial force exerted on the roll such as may occur when a thick bunch of material passes under the roll or upon passage of any foreign matter thereunder. Inasmuch as the discs present no shoulders or surfaces, either at their peripheries or on their sides to prevent free compressibility of the sections, or to cause any uneven compression thereof, the roll may be used for a long period of time before it is necessary to renew any of the sections and will act more uniformly on the wool or other material undergoing treatment. Tests have indicated that rolls constructed as disclosed herein will last a long period of time under normal conditions of use, and this is due to the fact that the discs do not impose any abnormal or uneven strains on the sections as a consequence of the radial compression of the sections during the service of the roll.

While I have illustrated a preferred form of the invention, it should be understood that the invention is to be limited only by the scope of the appended claims.

I claim:

1. A sectional roll comprising a shaft, a plurality of annular sections of homogeneous resilient compressible material held on said shaft under axial compression in face to face relation, the adjacent faces of said sections being normally flat, and means forming driving surfaces between said sections to prevent relative slippage of said sections around said shaft, said means comprising metallic discs secured to said shaft and having smooth uninterrupted faces merging at their peripheries into thin edges thereby permitting substantially uniform compression of all portions of each section normal to the shaft.

2. A sectional roll comprising a shaft, a plurality of flat-sided rubber sections held under axial compression on said shaft and keyed thereto, a thin, smooth metallic disc of smaller diameter than said sections interposed between each pair of sections and keyed to said shaft, the sides of each disc merging into a thin edge so that no portion of any disc offers any appreciable resistance to the inward compression of any portion of any section.

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