April 29, 1941. R. I. VAN ALSTINE 2,240,382

REGROOVER FOR TIRES

Filed June 30, 1939

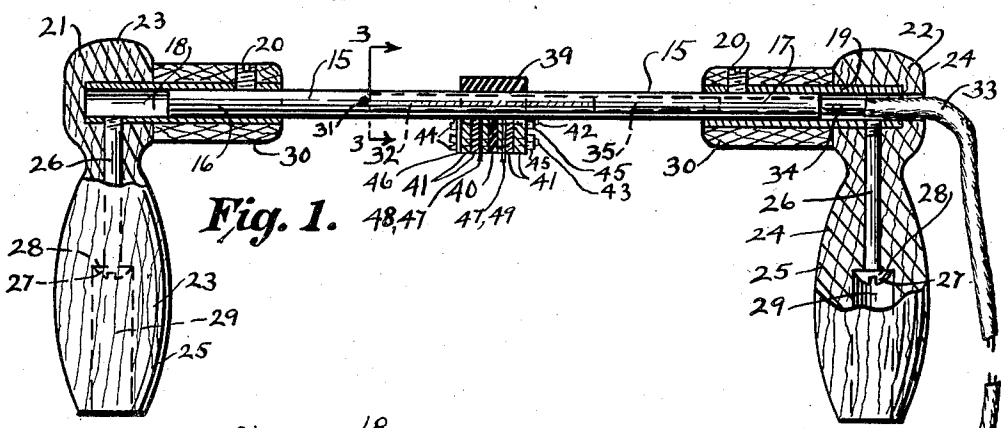


Fig. 1.

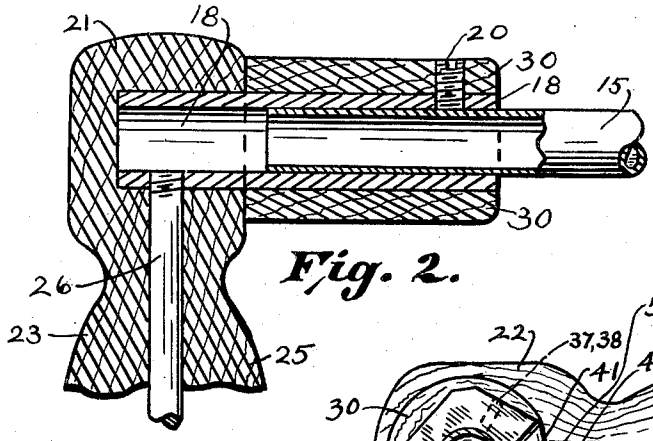


Fig. 2.

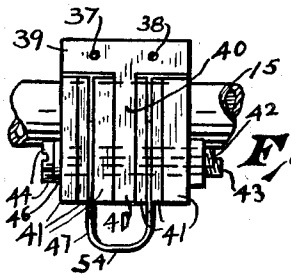


Fig. 4.

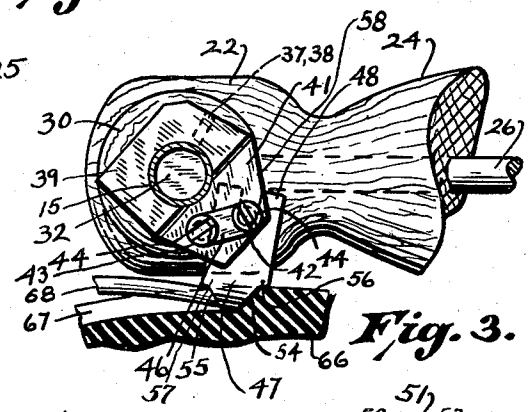


Fig. 3.

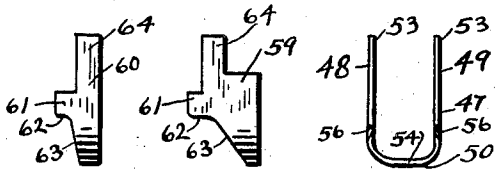


Fig. 8. Fig. 7. Fig. 6. Fig. 5.

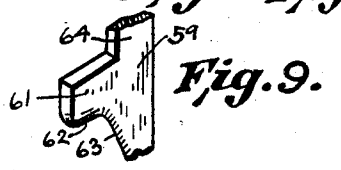


Fig. 9.

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2,240,382

REGROOVER FOR TIRES

Robert I. Van Alstine, Philadelphia, Pa.

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9 Claims. (Cl. 30—140)

My invention relates to electrically heated regroovers for tires.

Used rubber tires sometimes become so worn on the tread that the anti-skidding grooved surface is worn away, either partly or all the way down to the bottom of the grooves, and either over only part of the tread, or the grooving is obliterated altogether. Where there is enough of the tread surface left for safely deepening the grooves, or reproducing the same where they have been worn away, or where the tread surface is built up with an additional layer of rubber, the regrooving is done by the use of a hand tool.

Various kinds of these hand-operated regrooving tools are in use, some more efficient and more easily operated than others. It is important, in the formation and design of such regrooving tools, that the same be adapted to be readily handled without causing undue fatigue to the operator in the continuous handling of the tool. The form of the handle best adapted for holding the tool in various positions for operation is important, as well as is the formation of the cutting blade to reduce its friction as it plows through the rubber surface.

I have, therefore, various objects in view in providing a suitable regrooving tool for tires. Considering the handling of the tool, there are times when the common form of draw-knife handles are suitable. These handles extend at right angles to the end portions of the longitudinal body of the tool. Inasmuch as such handles require a considerable gripping effort to keep the tool from slipping out of the hands when it is being pulled to plow a groove, one of my objects relates to providing an L-extension to each of such draw-knife handles. Each extension runs part way on to the end portions of the longitudinal body of the tool, so that these extensions can lie beneath the fingers of the hand, and can be held with the fingers acting as hooks when pulling the tool, to plow it through the rubber; at the same time, those portions of the handles which extend at right angles to the body of the tool serve, when bearing upon the palm of the hand, to prevent the tool from turning in the hand.

In connection with the handles and their L-extensions, I desire to have the same made of heat insulating material, such as wood, and to have these L-extensions releasably fixed, in sliding engagement with the tool body.

Another object of my invention is to have the longitudinal body of the tool, which carries the grooving knife, tubular, so as to have an electrical heating unit centrally positioned within the tubular body.

A further object is to have the member which is to be used as a knife holding member made of a block of heat absorbing metal, fixed at and surrounding the mid-portion of the tubular body of the tool, where it will also surround the heating unit.

Another object is to have a portion of the knife holding member serve as an adjustable clamp for the two ends of a U-shaped blade, having the said portion made up of a plurality of separable, heat absorbing plates, bound together by one or more bolts, and having one of said plates extend integrally with the body of the block or knife holding member. My object in using such plates is to adapt the same to have the sheet metal end or ends of the knife blade gripped between contiguous and releasably bound plates, while at the same time, to build up a heat transferring body portion to the block, having considerable area of contact between the blade ends and the plates, for transferring heat more readily to the thin blade used.

In connection with the formation of the blade carrying block, I desire to have the lower part thereof cut back or tapered, so as to afford the operator a fuller view of the blade, as he uses it.

In connection with the formation of the blade itself, one of my objects is to form said blade with blunt extending edges above, and in line with, the cutting edge proper, so that these blunt edges will limit the depth of cut formed by the cutting edge, by riding upon the surface of the rubber and not cutting down into it. In providing such blunt surface riding edges to the blade, above its cutting edge, the knife block can be spaced away from the rubber, and so prevent loss of heat into the rubber and reverse it for the knife. A further object in connection with the formation of the blade is to reduce its friction, as it is plowed through the rubber, by having the same narrower at the bottom thereof, than at the top, so tapering the blade, as to its width, that the upper part of the blade will be strengthened by its greater width.

With these and other objects, as will hereinafter appear, my invention resides in certain construction, one embodiment thereof, including various forms of knives, being illustrated in the drawing and being hereinafter described. The operation of the same is explained and what I claim is set forth.

In the drawing:

Figure 1 is an elevation, partly shown in sec-

tion, of a tire regrooving tool embodying my invention.

Figure 2 is an enlarged fragmentary sectional elevation showing the handle and its L-extension for one end of the tool.

Figure 3 is an enlarged sectional elevation of the tool, taken on the line 3—3, of Figure 1, but having the axis of the main part of the handle turned up horizontal and showing the tool knife cutting a groove into a portion of a rubber tire.

Figure 4 is a front elevation of the knife block and knife shown in Figures 1 and 3.

Figure 5 is a side elevation of the form of knife blade shown in Figures 3 and 4.

Figure 6 is a front elevation of the knife blade shown in Figures 3, 4 and 5.

Figures 7 and 8 are side elevations of modified forms of knife blades, as compared to that shown in Figures 5 and 6, and having the same general, front elevation appearance as shown in Figure 6.

Figure 9 is an enlarged fragmentary perspective view of a blade, illustrating the continuity of the blunt surface riding edge with the lower cutting edge.

In the figures—

Considering the construction of the tool, the body thereof, formed by a long metal tube 15, has its ends 16 and 17 in sliding engagement, respectively, with the tubular bushings 18 and 19. The position of each bushing upon the tube 15 is adjustably fixed by a screw 20, threaded into the bushing. These bushings 18 and 19 enter the respective heads 21 and 22 of the handles 23 and 24, respectively. The long portions 25 of the handles are engaged by bolts 26, in threaded engagement with the bushings 18 and 19, respectively. Each bolt 26 has a head 27, bearing against the shoulder 28, at the upper end of the larger drilled hole 29. Surrounding each of the bushings 18 and 19 is a wooden sleeve 30, which, with the bushing it covers, forms an L-extension to each of the handles 23 and 24.

Centrally positioned within the tube 15, up against the cross-screw 31, is an electric heating unit 32. Wires from an electric conduit 33 pass into the head 22 of the handle 24, and thence through the tubular insulators 34 and 35, to connect with the unit 32. The conduit 33 has a plug 36, adapted to go into the usual outlet socket for current, to heat the unit 32.

Positioned upon the tube 15, and adjustably fixed thereon by screws 37 and 38, is the metal knife block 39, which surrounds the tube 15. This mounting of the cutter block 39 makes it possible to shift the block along the tubular member 15, as desired by the user, and to rotate it around the tube to vary the angular relationship between the cutter and the handles 23 and 24. This block 39 has a narrow or plate-like extension 40 integral therewith. Adjoining this plate extension 40 are other plates 41, similarly shaped to the extension 40, and preferably in contact with the tube 15 for the transfer of heat thereto from said heating unit 32. Passing through each plate 41, and the plate extension 40, are two bolts 42 and 43, having heads 44 and nuts 45. Under the heads 44, next to an outer plate of the plates 41, is a short flat binding link 46. The bolt 42 is preferably positioned nearer to the tube 15 than is the bolt 43 for positioning the sheet metal, U-shaped blade 47, as shown in Figure 3. The blade 47 has two leg portions 48 and 49 and a bent portion 50. Each leg portion is notched at 51, forming two narrow ends 52 and 53. In Figures 1, 3 and 4 the ends 52 of the leg portions 48 and 49 are positioned between adjoining plates of the plates 41 and pass up between the bolts 42 and 43, and are there clamped by the said bolts. The bent portion 50 of the blade 47 has a forward cutting edge 54, and a rear cutting edge 55. The upper part of the cutting edge 54 merges on each side into a blunt, non-cutting edge 56, and the upper part of the cutting edge 55 merges on each side into a blunt, non-cutting edge 57. These blunt edges 56 and 57 are adapted to ride upon the surface of the rubber to limit the depth of cut in forming a groove in the tire tread, and are adapted by being spaced from the plates 41 to keep the heated block 39 from touching the tire surface. It will be noticed that the block extension 40, and its adjoining plates 41, are formed with a rearwardly inclined front part 58, so as to afford the operator a full view of the blade, or that part thereof which extends up from the tire tread, as the operator progresses with the formation of the tire grooving.

The sheet metal U-shaped blades 59 and 60, shown respectively in Figures 7 and 8, each has a forward extension 61. Each of the extensions 61 has its under edge 62 made blunt, to be non-cutting. Extending below the edges 62 is the rearwardly inclined cutting edge 63, which is shown more inclined in Figure 7 than in Figure 8. Each of the blades 59 and 60 has up-standing extensions 64 adapted to be clamped between the plates 41 and between the bolts 42 and 43.

The enlarged view of a portion of a blade, such as is shown in Figures 7 and 8, is more clearly shown in Figure 9 to be rounded at the blunt edge 62, and the sharpness of the cutting edge 63 is better illustrated.

While the cutter blades, adjacent their cutting edges, are relatively narrow, as at 50, Fig. 5, and at 63, Figs. 7 and 8, so that they will pass easily through the rubber, they are made wider above the cutting edges to give the blades added strength and rigidity.

For operation, the operator first selects the style of blade which he thinks most suitable for width and depth of groove to be cut. He next holds this blade with its up-standing legs parallel and inserts them between such adjoining plates, or pairs of plates, as will approximately hold the said legs parallel when clamped by the bolts 42 and 43. The plates 41 vary in thickness, so as to facilitate such selection as will enable the operator to have the blade legs clamped parallel. In selecting a blade that is best suited for his purpose, the operator also has a choice of one of two cutting edges shown in the blade 47, of Figure 3, wherein the blunt edge 56, being farther from the lower part of the adjoining edge than the blunt edge 57, will permit the blade 47 to cut a deeper groove. The blunt surface running edges of such blades readily limit the depth of cut when forming the grooves and, at the same time, keep the heated clamping block and its plate parts from coming in contact with the rubber, so the blade can then be continuously supplied more readily with heat.

Having the tool equipped with the desired blade, the operator next plugs into a nearby socket for current to heat the device and proceeds to do his grooving. In Figure 3, the forward cutting edge 56 of the blade 47 is shown in the act of plowing into the rubber tread 66 to form a groove 67. 68 is the cut out portion of rubber as it leaves the knife. The blunt forward extending edge 56 of the blade 47 is shown riding upon the upper

surface of the tread 66 and limits the depth to which the blade can go into the rubber. The lower rounded part of the blade is slightly tilted by the way the operator holds the handles of the tool. This tilting causes the blade to pull down into the rubber until its incutting is limited by the blunt non-cutting riding edges of the blade.

In handling the tool, the L-extensions 30 of the handles enable the operator to have the long portions of the handles lie longitudinally against the palms of his hands, while his fingers are bent forward over the L-extensions as hooks, to give him a much better hold on the tool in pulling its knife through long circumferential grooves or cross grooves; but, if desired, he can hold the tool by gripping the handle parts in the usual way.

Inasmuch as changes can be made in the construction of the tool or its blades differing from those illustrated and described, without departing from the spirit and scope of my invention, I wish to include all modifications which come within the scope of the following claims.

I claim:

1. In a tire grooving tool a U-shaped blade formed with a cutting edge at its lower curved portion, said blade having blunt forwardly extending edges adjoining the upper ends of said cutting edge, said blunt edges being adapted to ride upon the surface of the rubber tread of a tire to limit the depth of cutting by said cutting edge.

2. In a tire grooving tool a U-shaped blade formed with a cutting edge at its lower curved portion, said blade having blunt, forwardly extending edges adjoining the upper ends of said cutting edge, said blunt edges being adapted to ride upon the surface of the rubber tread of a tire to limit the depth of cutting by said cutting edge, said cutting edge being inclined rearwardly.

3. A tire grooving tool including a tubular member, a handle fixed to each end of said member, electrical heating means positioned within said tubular member, approximately midway of its ends, an electrical circuit means connected with said heating means, adapted to be connected with a source of electricity, a grooving knife, a heat absorbing block positioned upon the outside of said tubular member in a transverse plane to the same, which passes through said heating means, a clamp on said block adapted to releasably hold said knife, said clamp comprising a plurality of heat absorbing leaves adapted to have a part of said knife held between two of said leaves that are contiguous, and a binder for compressing said leaves together to hold said knife, one of said leaves being integral with said block.

4. In a tire grooving tool, a U-shaped blade the sides thereof being relatively narrow adjacent the lower curved cutting portion of the blade, the cutting edges of the blade extending upwardly and forwardly to form portions of greater width above the lower curved portion of the blade, the said upwardly and forwardly extending cutting edges merging into blunt non-cutting forward extensions adapted to ride upon the surface of the tire to limit the depth of the groove.

5. A tire grooving tool comprising a tubular member, a heater therein, handles one at each end thereof, a heat transmitting block mounted on the tubular member to be heated by the heater, a cutter mounted on the heat transmitting block, and means for holding the cutter in position on the block.

6. A tire grooving tool comprising a tubular member, an electric heater therein, handles one at each end thereof, a heat transmitting block rotatably mounted on the tubular member so as to be heated by the heater, means for holding the heat transmitting block in position on the tubular member, a cutted mounted on the heat transmitting block, and means for holding the cutter in position on the block.

7. A tire grooving tool comprising a cylindrical tubular member, heat insulating L-shaped handles one for each end of the tubular member one leg of each handle enveloping one end of the member and the other leg of each handle projecting from the first mentioned leg at an angle thereto, so that the hands of the operator may engage with either or both legs of the handles, an electric heater within the tubular member between the handles, a heat transmitting block adjacent the heater to be heated thereby, a cutter on the block, and means for holding the cutter in position on the block.

8. A tire grooving tool comprising a cylindrical tubular member, heat insulating L-shaped handles one for each end of the tubular member one leg of each handle enveloping one end of the member and the other leg of each handle projecting from the first mentioned leg at an angle thereto, so that the hands of the operator may engage with either or both legs of the handles, an electric heater within the tubular member between the handles, a heat transmitting block rotatably mounted on the tubular member, a cutter on the block, and means for holding the cutter in position on the block.

9. A tire grooving tool comprising a tubular member, handles one at each end thereof, an electric heater within the tubular member approximately midway the ends thereof, a heat transmitting block surrounding the tubular member in heat conducting contact therewith and adjustable longitudinally and angularly with respect thereto, a cutting blade on the heat transmitting block, and means for securing the cutting blade in position on the block.

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