

July 28, 1931.

H. C. HOWSAM ET AL

1,816,151

REENFORCEMENT APPLYING APPARATUS

Filed Dec. 16, 1929

2 Sheets-Sheet 1

Fig. 1

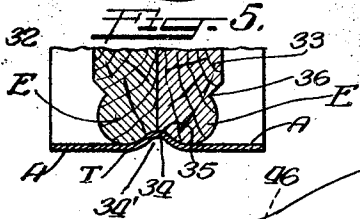
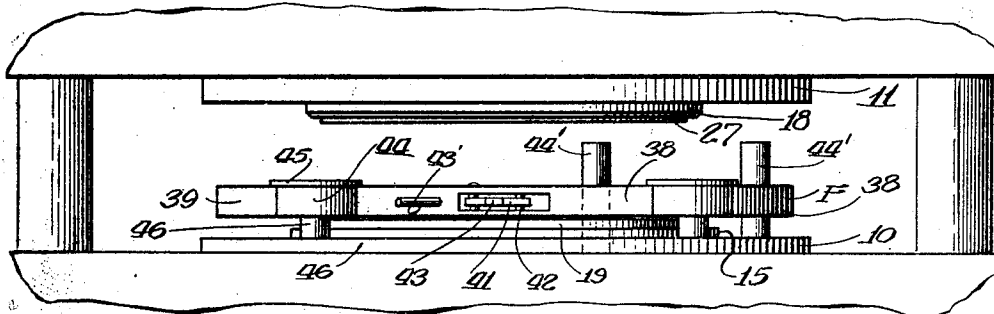
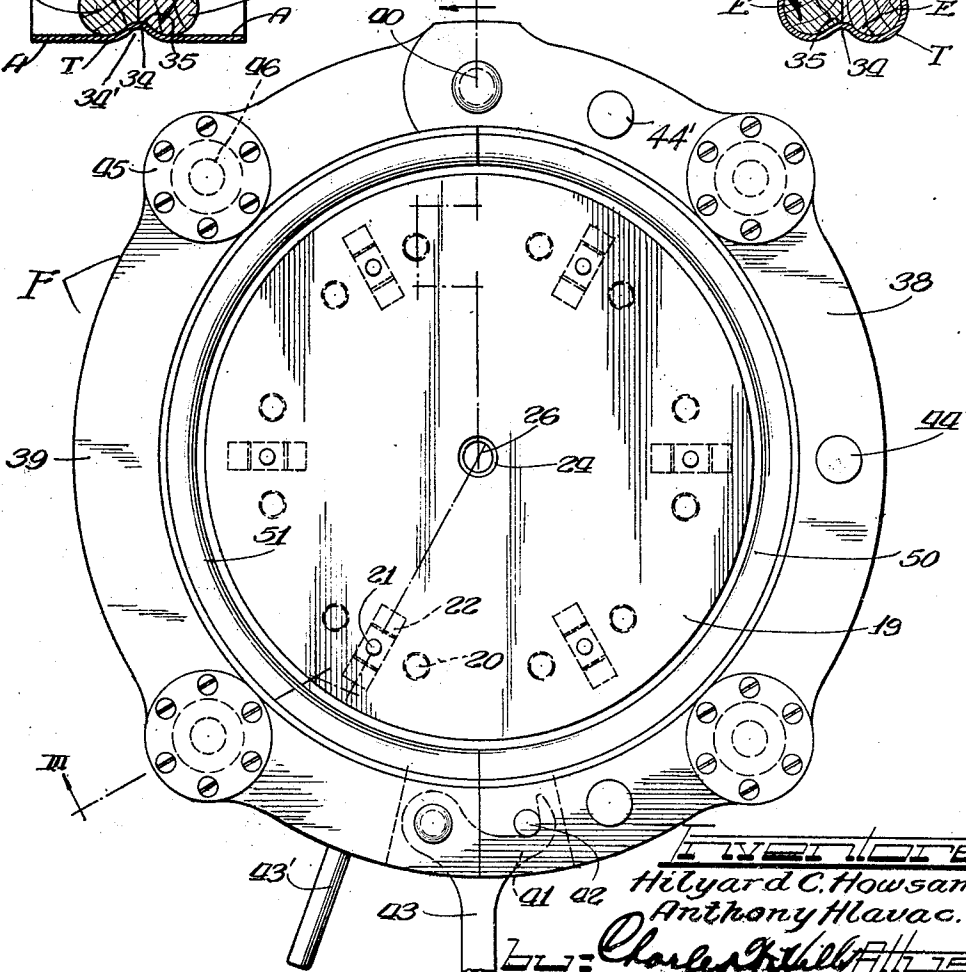
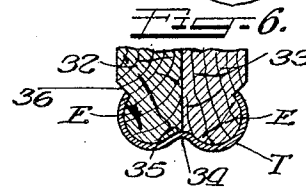


Fig. 2



WITNESSES
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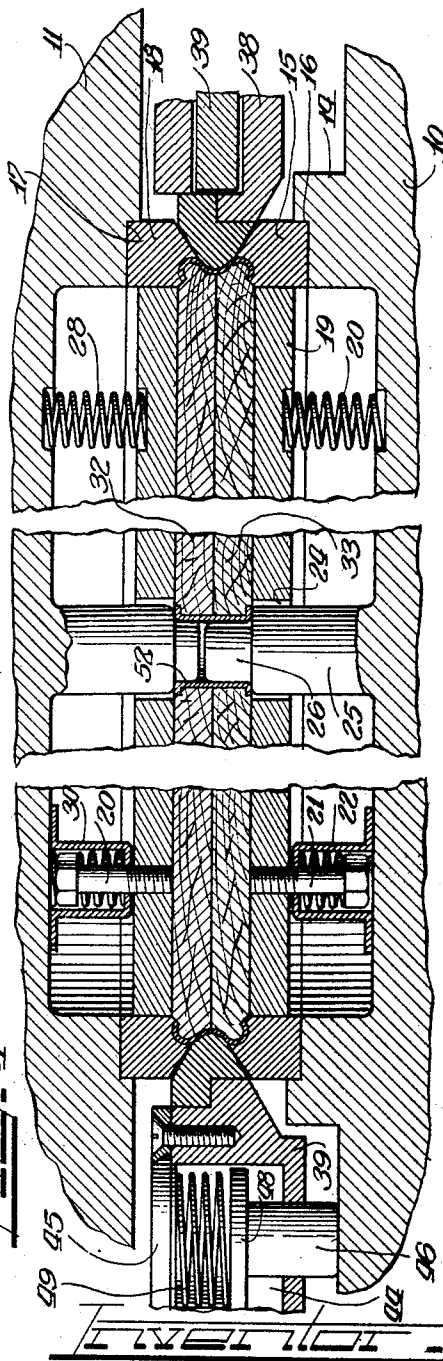
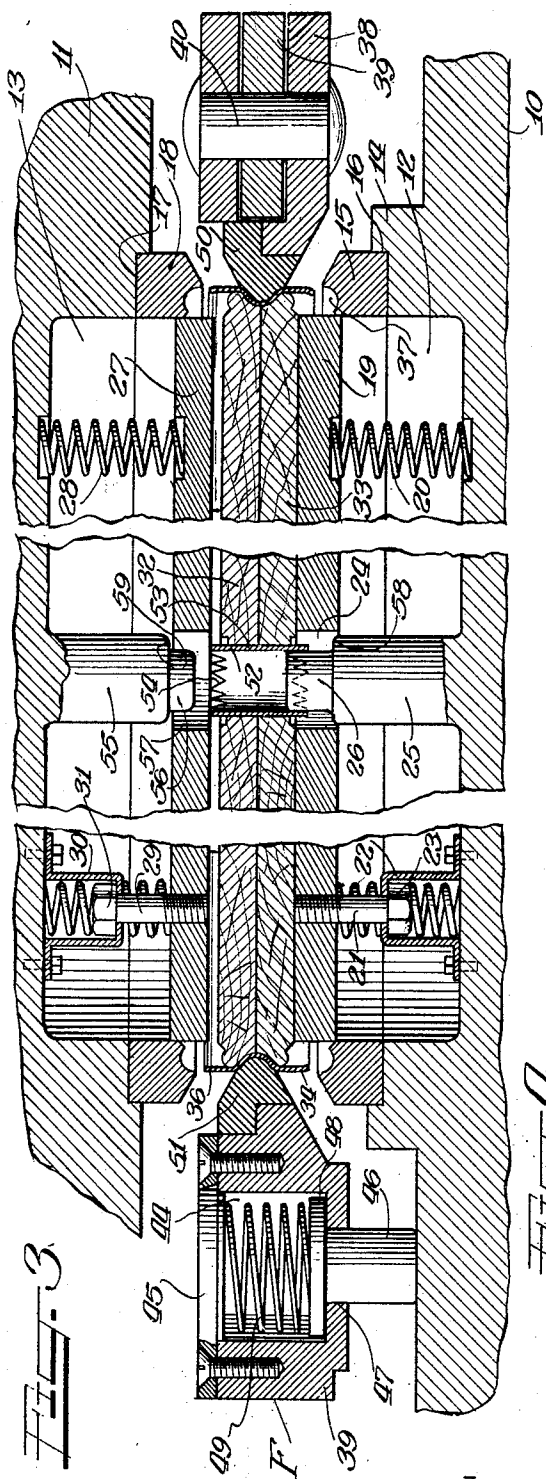
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REINFORCEMENT APPLYING APPARATUS

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2 Sheets-Sheet 2



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REENFORCEMENT APPLYING APPARATUS

Application filed December 16, 1929. Serial No. 414,611.

This invention relates to reenforcement applying apparatus which is particularly useful and practical for applying sheet metal reinforcing rims or tires and axial clamping and bearing bushings to the non-metallic laminated end discs or heads of reels for supporting heavier material such as insulated wires or cables.

In a copending application of Eber J. Hubbard, Serial No. 406,772, filed November 3rd, 1929, there is disclosed a reel whose laminated end discs or heads are provided with a sheet metal reinforcing rim or tire intimately clinched thereto, and with sheet metal bushings clamping the lamination together at the axes of the heads. An important object of our invention is to provide simple and efficient apparatus for quickly and economically applying the rim or tire with securing clamping and clinching engagement to the periphery of the head and during the same operation applying a sheet metal bushing in an axial bearing passage through the head to rigidly and securely clamp the head laminations together at the head axis.

The various features of our invention are embodied in the structure disclosed on the accompanying drawings, in which

Figure 1 is a side elevation showing the relatively movable parts of a press and the reenforcement applying apparatus mounted thereon;

Figure 2 is a plan view of the apparatus;

Figure 3 is an enlarged section on plane III—III of Figure 2 showing a reel head placed in the apparatus ready for the applying operation;

Figure 4 is a similar sectional view showing the parts after the pressure and applying operation;

Figure 5 is an enlarged cross-sectional view of the reel head and reinforcing rim in embryo form; and

Fig. 6 is a similar sectional view showing the rim fully applied.

On the drawings, 10 represents the base or bed and 11 the reciprocal head of a press, the bed and head having opposed cylindrical depressions or pockets 12 and 13 respectively.

Surrounding the bed pockets 12 is an annular boss 14 forming a seat for the lower annular die 15, the die abutting against the shoulder 16 on the boss and having its inner face flush with the inner face of the pocket 12. The movable head of the press has the annular recess 17 surrounding the pocket 13 in which recess is seated the annular upper die 18 with its inner face flush with the cylindrical side of the pocket 13.

Reciprocal within the die 15 is a circular supporting disc or plate 19 whose diameter is substantially equal to the inner diameter of the die, and interposed between this plate and the bottom of the pocket 12 are a number of compression springs 20 which tend to hold the plate in its outer position indicated in Figure 3. Stop studs 21 extend downwardly from the plate and through U-shaped brackets 22 secured to the bottom of the pocket, the heads 23 on the studs, by their engagement with the bracket ends, limiting the outward movement of the plate.

The plate 19 has the axial cylindrical passage 24 for receiving the cylindrical die stud 25 projecting upwardly from the press bed 10 in the pocket 12, this die stud having the outer reduced end or neck 26 for a purpose to be hereinafter more fully explained.

Reciprocal within the upper die 18 is a circular disc or plate 27 whose diameter is substantially the same as the inner diameter of the die and between which and the bottom of the pocket 13 are interposed a number of compression springs 28 which tend to hold the plate in its outer position as shown in Figure 3. The studs 29 extending from the plate through the brackets 30 secured to the press head 11 have the heads 31 for engaging against the outer ends of the brackets to limit the outward movement of the plate 27.

The reel head, for the assembly and reenforcement of which our improved apparatus has been designed, comprises two circular discs 32 and 33 which may be of non-metallic material such as wood. The reinforcing rim or tire T is primarily of the cross-section shown in Figure 5. This initial form is obtained by rolling a length of plain band of sheet metal to circular

form, then welding or otherwise securing the ends together, and then forming therein, as by rolling, the internal annular ridge or bead 34 midway between its sides.

5 The discs 32 and 33 are previously formed with their inner peripheral edges recessed so that when the discs are brought together they present the annular groove or channel 35 for receiving the ridge 34 of the tire structure. Each disc has also an annular 10 recess 36 in its outer side a short distance radially inwardly from the groove 35, and the outer edge section E of each disc between the groove and the recess is rounded 15 to be of substantially semi-cylindrical cross-section. Around these semi-cylindrical edge sections the sides A of the embryo tire structure are to be intimately deflected with their ends within the recesses 36 as indicated in 20 Figure 6, these sections being then securely clamped by the clinching thereto of the tire structure sides.

The annular dies 15 and 18 have the die or forming grooves 37 corresponding in shape 25 with the peripheral edges of the discs around which the sides A of the tire are to be clamped and clinched. Referring to Figure 3, the press head 11 is normally raised away from the bed 10 and the supporting plates 30 19 and 27 are in their outer positions. When a reel head is to be assembled and reinforced, two discs are applied from opposite sides into an embryo tire structure to receive the ridge 35, and the assembled discs with the 35 tire structure thereon are then laid on top of the lower plate 19.

In order to accurately align the discs and the embryo tire with the annular dies and to hold the tire against distortion while 40 the tire sides are being deflected and clinched around the disc peripheries, an aligning and clamping frame F is provided. This frame is annular and concentric with the annular dies and is preferably composed of the two semi-circular 45 sections 38 and 39 hinged together by a pin 40 at one end and having their other ends detachably locked together by a suitable latch as for example a hook 41 pivoted to 50 one of the members and a pin 42 on the other member, the hook being readily operable by its handle or grip 43. The member 38 of the aligning and clamping frame is secured against radial displacement by 55 means of pins 44' extending upwardly from the press bed 10 and these pins also serve to center and align the press head 11 relative to the bed when the head is forced down. The frame F is, however, free for axial 60 movement, such movement being guided by the pins 44'.

Each of the frame members 38 and 39 has a number of pockets 44 provided with removable covers 45. A foot 46 extends down- 65 wardly through an opening 47 in the base

of each pocket 44 and within the pocket has an abutment head 48 for a compression spring 49 which abuts at its upper end against the cover 45. The feet 46 rest 70 on the press bed 10 and normally the springs are extended to hold the frame in vertical alignment with the reel head forming parts placed on the plate 19, the frame members having the semicircular dies or engaging in- 75 serts 50 and 51 of such cross-section that at their inner ends they will fit into the annular belt groove 34' formed in the outer side of the embryo tire by the ridge 35 therein. Before the head discs with the em- 80 bryo tire thereon are applied to the plate 19, the frame member 39 is swung outwardly to make way therefor and then the member 39 is swung back and interlocked with the member 38 by the hook 41, a handle 43' 85 forming a convenient means for swinging the member 39. The die and abutment inserts 50 and 51 will then engage in the tire groove and will hold the discs and tire in accurate alignment on the press ready for 90 the clamping and clinching operation. The press is now started and as the press head 11 travels downwardly its plate 27 will first engage with the upper reel head disc where- upon the springs 20 and 28 are put under 95 compression so that the reel head discs are securely but resiliently clamped together between the plates 19 and 27. During such clamping the plates move downwardly with the clamped discs and the frame F will 100 move downwardly therewith, and pins 44' on which the frame member 38 is slidable, serving to accurately guide the frame F in its downwardly movement, and such move- 105 ment is resisted by the compression of the springs 49. Eventually, the annular dies 15 and 18 reach the projecting sides A of the embryo tire structure and these sides are curled, clamped and clinched around the 110 semi-cylindrical peripheral sections of the reel head discs, the frame F rigidly holding the central portion of the tire during such deflection and clamping of the side sections of the tire and during such opera- 115 tion the spring pressed plates 19 and 27 hold the reel head discs securely against each other.

The reel heads usually have axial open- ings for receiving a supporting shaft for the reel during winding or unwinding there- 120 of. To reinforce such bearing openings sheet metal bushings are preferably provided and our improved apparatus may be readily adapted to apply such bushings 125 simultaneously with the clinching of the tire structure to the head discs. Either before or after the head discs are placed in the press a sheet metal bushing 52 is inserted in the registering openings 53 provided 130 therefor in the discs. Such bushings may readily be formed by rolling from a sheet 135

metal blank and preferably the edges of the bushing have serrations or teeth 54.

For clamping these bushings to the head discs the die stud 25, already referred to, is provided on the press head 10. A companion die stud 55 is provided on the press head and has the reduced end or neck 56 like the neck 26 of the stud 25. The upper plate 27 has the opening 57 for receiving the stud 55 and as the press head is moved downwardly the plate openings 24 and 57 receive the studs 25 and 55 respectively and the stud necks enter the opposite ends of the bushing 52. Then as the serrated ends 5 of the bushings are engaged by the shoulders 58 and 59 of the respective die studs, they are deflected radially outwardly and then downwardly against the outer face of the discs 32 and 33 with the teeth or serrations impressed into the discs so that the bushing will be securely locked against rotation in the discs. When the press head 11 is now withdrawn, the frame member 39 is swung open and the finished and reinforced reel head is removed from the press. The apparatus parts are restored to their normal position by their springs ready for receiving another charge of reel head forming parts.

We thus produce a simple and efficient apparatus by means of which a reinforcing sheet metal tire and bearing bushing may be quickly, accurately and economically applied to non-metallic discs to form a reinforced reel head. It is to be understood that although we have shown and described one practical and efficient embodiment of the features of our invention, the invention is not limited thereto, but only in so far as defined by the scope and terms of the appended claims.

We claim as our invention:

1. In apparatus of the class described, the combination of upper and lower relatively movable supporting members, opposed annular die members on said supporting members, opposed spring-pressed supporting and clamping plates movable within said die members and adapted to receive between them the work to be treated, and an aligning annulus concentric with said die members and plates, said annulus being adapted to be opened to permit application of the work between the plates and to be closed to clamp the work around its periphery, and yielding means normally holding said annulus in clamping alignment with the work.

2. In apparatus of the class described, the combination of upper and lower relatively movable supporting members, opposed annular die members mounted on said members, opposed spring-pressed supporting and clamping plates movable within said die members for receiving between them and clamping work before the die members are

brought into operative engagement with the work when said pressure members are relatively moved, and an aligning annulus concentric with and between said die members for engaging the periphery of the work to hold it in alignment between said pressure plates and die members, said annulus being spring supported to be shiftable axially with the clamped work.

3. In apparatus of the class described, the combination of upper and lower relatively movable supporting and pressure applying members, opposed annular die members on said supporting members, means carried by said supporting members for vertically supporting work between said die members, and a sectional annulus mounted on one of said supporting members and adapted to be opened for the insertion of work between the die members and to be closed to clamp the work in transverse alignment with reference to said die members.

4. In apparatus for applying a sheet metal reinforcing tire to a reel head, the combination of upper and lower relatively movable pressure applying members, opposed annular dies on said pressure applying members, yieldable means on said pressure applying members for supporting between them a head with an embryo tire around the periphery thereof, and an aligning annulus concentric with and between said die members for engaging the embryo tire to hold it in alignment with said die members when said die members are moved by said pressure applying members to deflect the tire around the head periphery.

5. In apparatus of the class described, the combination of upper and lower relatively movable pressure applying members, opposed upper and lower annular dies on said members, upper and lower plates axially shiftable within said dies and guided thereby, springs normally holding said plates outwardly beyond the dieing surfaces of said dies, and a frame between and concentric with said dies for holding work between said plates in alignment with said dies, relative pressure applying movement between said members bringing said plates into clamping engagement with work therebetween before the dies become effective, said frames being axially shiftable to follow the movement of the work.

6. In apparatus of the class described, the combination of a press structure having upper and lower relatively movable pressure applying members, upper and lower dies on said pressure applying members, yieldable supporting plates on said pressure applying members within said dies, said plates being adapted to receive between them the work to be acted upon by said dies, and a frame between and concentric with said dies for aligning work between said plates, said

frame being immovable radially but yieldable in axial direction to follow the movements of the work during application thereof of said plates and said dies.

7. In apparatus of the class described, the combination of a press bed and a pressure applying head, upper and lower annular die members supported on said head and bed, upper and lower spring-pressed supporting plates axially shiftable in and guided by said die members, said plates clamping work placed between them preparatory to operative engagement of the die members with the work when the press head is moved toward the press bed, and a clamping frame between and concentric with said die members for receiving and clamping the work to hold it radially in alignment with said die members, said frame being axially yieldable to follow the movements of the work under the application of the pressure plates and die members thereto.

8. In apparatus for applying to a laminated reel head a sheet metal tire having a peripheral belt groove intermediate its sides, the combination of upper and lower relatively movable pressure applying members, opposed annular dies on said pressure applying members, yieldable means on said pressure applying members for supporting between them a head with the embryo tire thereon, an aligning annulus concentric with and between said die members, the inner side of said annulus being of conical cross section for engaging in the belt groove of the tire thereby to hold the head and tire in alignment with said die members when said die members are moved by said pressure applying members to deflect the tire around the head periphery, said annulus being radially immovable but vertical yieldable in order to follow the movement of the head and tire during application of the dies thereto.

9. In apparatus for applying a sheet metal tire and a bearing bushing to a laminated reel head, the combination of upper and lower relatively movable pressure applying members, opposed annular dies on said pressure applying members for applying the tire and opposed die studs on said members for securing the bushing, and yieldable means on said pressure applying members for supporting between them the head with the embryo tire and bushing thereon.

10. In apparatus for applying a sheet metal tire and a bearing bushing to a laminated reel head, the combination of upper and lower relatively movable pressure applying members, opposed annular dies on said pressure applying members for applying the tire and opposed die studs on said members for securing the bushing, yieldable means on said pressure applying members

for supporting between them the head with the embryo tire and bushing thereon, and an aligning annulus concentric with said die members for engaging the embryo tire to hold it in alignment during application of the die members and die studs with the tire and bushing respectively when said pressure applying members are operated.

11. In apparatus for applying to a laminated reel head a sheet metal tire with a belt groove and a sheet metal bearing bushing, the combination of upper and lower movable pressure applying members, opposed annular dies on said members for applying the tire and die studs for applying the bushing, yieldable means on said pressure applying members for supporting the head lamination and the embryo tire and bushing, and an aligning annulus concentric with said die members and engaging in the tire belt groove for holding said tire and thereby said laminations in concentric alignment with the annular dies and die studs, said annulus being vertically yieldable in order to follow the movement of the tire and bushing during the formation thereof by said die members and studs during operation of the pressure applying members.

In testimony whereof, we have hereunto subscribed our names:

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ANTHONY HLAVAC.

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