Feb. 16, 1937. F. S. STERNAD 2,071,048

APPARATUS FOR TREATING PLIED SHEET MATERIAL

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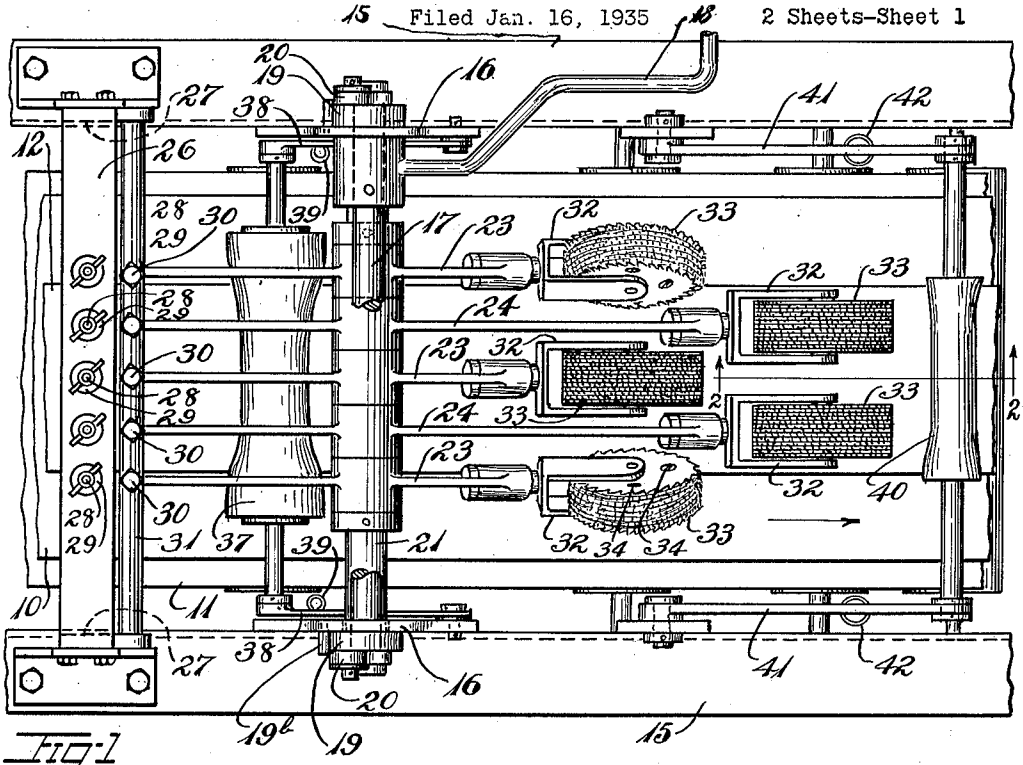


Fig-1

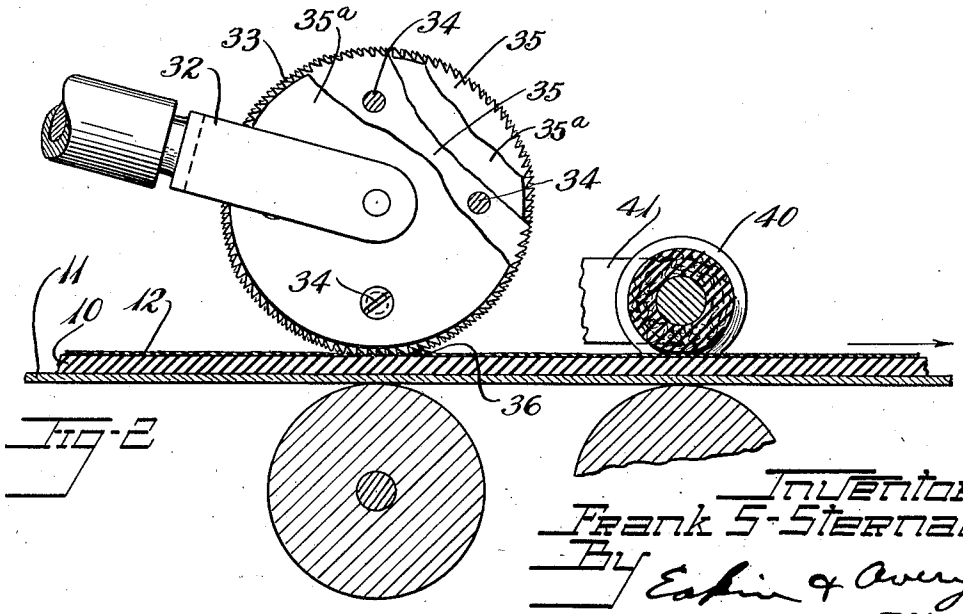


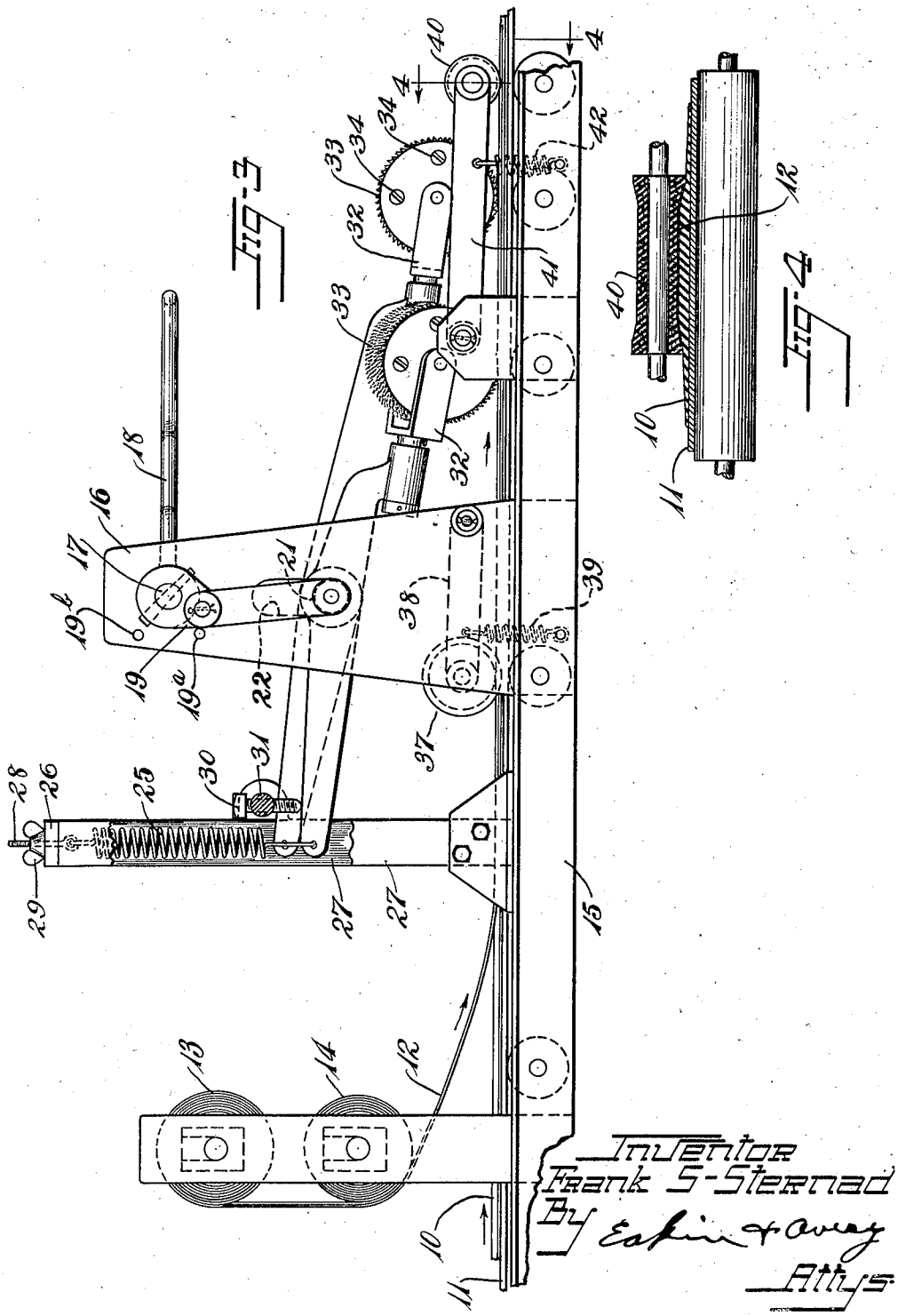
Fig-2

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2,071,048

APPARATUS FOR TREATING PLIED SHEET MATERIAL

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Application January 16, 1935, Serial No. 2,066

4 Claims. (Cl. 154—1)

This invention relates to methods and apparatus for removing entrapped air from plied-up sheet material such as unvulcanized rubber compositions, a composite tire-tread strip being chosen for the purpose of illustration herein.

In plying strips of such material air becomes enclosed between the plies, forming small pockets or blisters, and the chief objects of the invention are to provide improved procedure and apparatus for removing the air, and to provide for convenience, economy and effectiveness in the operation.

Of the accompanying drawings:

Fig. 1 is a plan view of apparatus embodying and adapted to carry out my invention in its preferred form.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a side elevation of the apparatus.

Fig. 4 is a section on line 4—4 of Fig. 3.

Referring to the drawings, 10 is a tread slab strip of rubber composition which is continuously fed forward on a conveyor belt 11 from an extruding machine (not shown) by which it is formed and 12 is a cushion strip which is continuously drawn from a supply roll 13 and past a liner-rewinding roll 14 and progressively into contact with the tread slab strip.

Rising from the respective sides of the frame 15 of the belt conveyor are standards 16, 16 in which is journaled near their tops a rock-shaft 17 provided near one end with a hand-lever or crank 18 and at each end with a short crank-arm 19 connected by a link 20 with a fulcrum shaft 21 which is vertically movable in slots such as the slot 22 (Fig. 3) formed in the standards 16. The fulcrum shaft is thus adapted to be raised and lowered by turning the hand-lever over-center to bring the short crank arms alternatively against stop pins such as the stop pins 19^a, 19^b (Fig. 3) projecting from the standards.

Fulcrumed independently of each other on the shaft 21 are several two-armed levers, 23, 23, 24, 24, of which the arm of each nearest the sources of supply of the material is connected by a pull-spring such as the spring 25 (Fig. 3) with a bar 26 which spans the conveyor and is secured to the top of standards 27, 27 mounted on the conveyor frame. The upper end of each spring is provided with an adjustment eye-bolt 28 which extends upward through a hole in the bar and is provided above the latter with an adjusting wing-nut 29.

Adjustable stop-screws 30, 30 are mounted in a bar 31 connecting the standards 27, for limiting upward movement of the adjacent arms of the levers 23, 24.

Swiveled to the outer end of the other arm of each of the levers is a journal yoke 32 having loose-journaled therein a piercing roller, 33, 33, adapted to run upon and pierce the cushion strip 12 and permit the escape of air from beneath it.

Preferably the piercing rollers are formed by securing together by means of screws 34, 34 a plurality of metal disks 35, 35 having their margins serrated, which conveniently provides for staggering of the teeth as shown clearly in Fig. 2 and also for giving the teeth a saw-tooth form, the disks 35 preferably being spaced apart by smaller intervening disks such as the disk 35^a, Fig. 2. Such form, with the tooth directed somewhat forwardly with relation to the direction of rotation of the roller, is desirable in that it causes the tooth effectively to penetrate the cushion strip 12 and in lifting it slightly in passing from it, as shown at 36 in Fig. 2, effects a lengthwise gashing of the stock which is desirable for fully venting the air.

On the supply side of the piercing rollers a pressure roll 37 of waisted form is mounted between the outer ends of arms 38, 38 hinged on the standards 16 and urged downward by pull springs 39, 39 for pressing the plies together and on the other side of the piercing rollers, for again pressing the composite strip progressively after the cushion ply has been pierced a similar presser roll 40 is mounted between the outer ends of arms 41, 41 which are hinged on the framing and urged downward by pull springs 42, 42.

It is believed that the operation of the apparatus will be entirely clear from the foregoing description and statements of function.

I claim:

1. Apparatus for removing entrapped air from between the plies of laminated material, said apparatus comprising means for feeding the material past a piercing station, a group of independently mounted piercing rolls at the piercing station for forming a multiplicity of inclined perforations in a ply of the material as it passes the station, and means common to the rolls for concurrently lifting them from the work.

2. Apparatus for removing entrapped air from between the plies of laminated material, said apparatus comprising means for feeding the material past a piercing station, a group of independently mounted piercing rolls at the piercing station for forming a multiplicity of inclined perforations in a ply of the material as it passes

the station, means individual to the rolls for urging them toward the work and means common to the rolls for concurrently lifting them from the work.

3. Apparatus for removing entrapped air from between the plies of laminated material, said apparatus comprising means for feeding the material past a piercing station, a group of independently mounted piercing rolls mounted to rotate on non-parallel axes at the piercing station for forming a multiplicity of inclined perforations in a ply of the material of non-linear lateral extent as it passes the station, means individual to the rolls for urging them toward the work, and means common to the rolls for concurrently lifting them from the work.

4. Apparatus for removing entrapped air from between the plies of laminated material which includes a rubber composition, said apparatus comprising means for advancing the material past a venting station, and means for there venting entrapped air in the material, said means comprising a roll having on its periphery piercing teeth of generally saw-tooth shape pressing into the material to gash as well as to pierce the rubber composition to effect the venting as it passes the roll.

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