Aug. 26, 1930. W. L. FAIRCHILD 1,773,810

VALVE STEM LOCKING MEANS FOR INNER TUBE MOLDS AND THE LIKE

Original Filed May 10, 1926 2 Sheets-Sheet 1

Fig. 1.

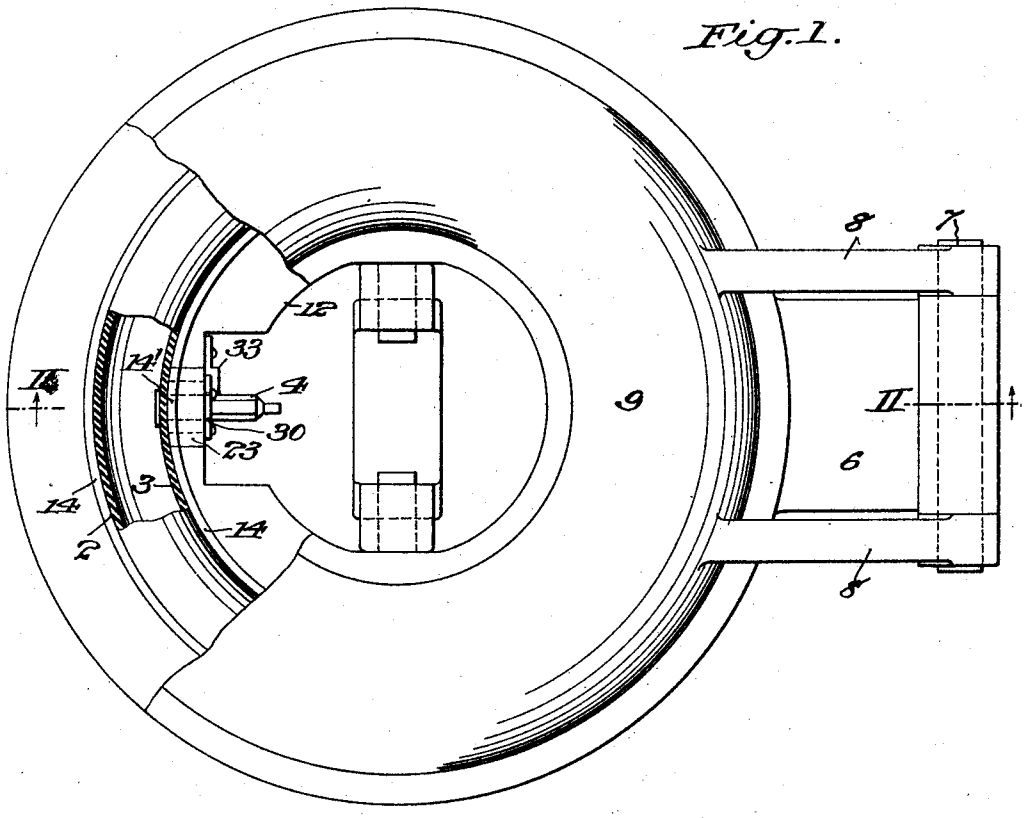
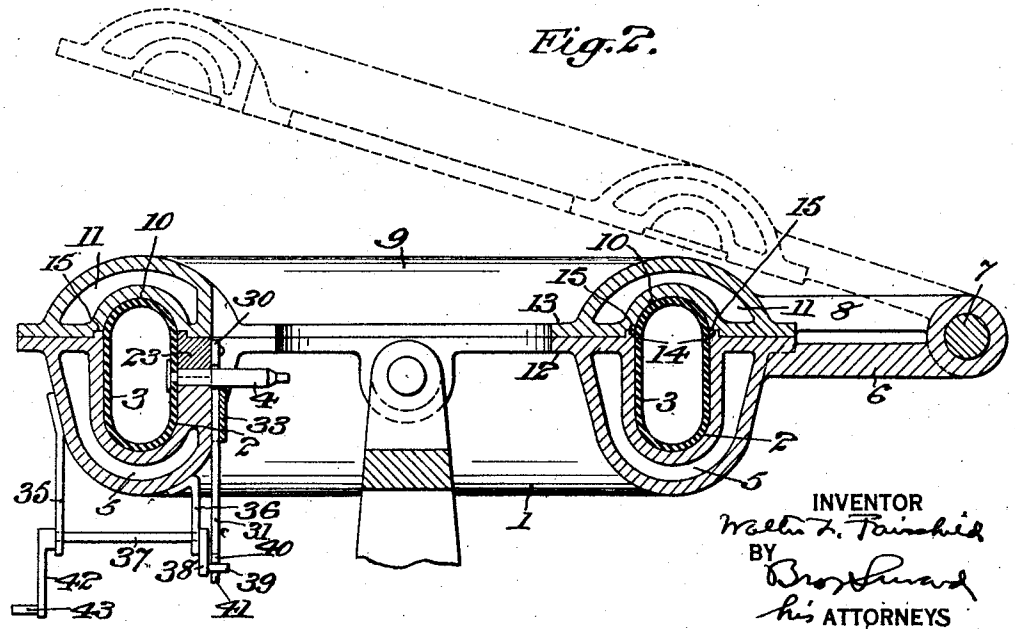


Fig. 2.



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Fig. 3.

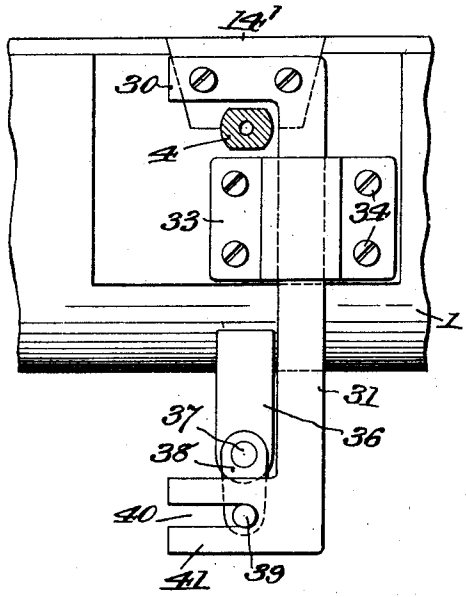


Fig. 4.

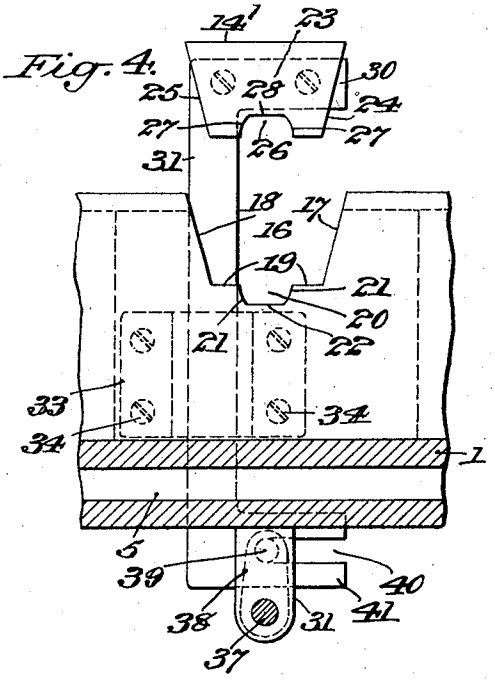


Fig. 5.

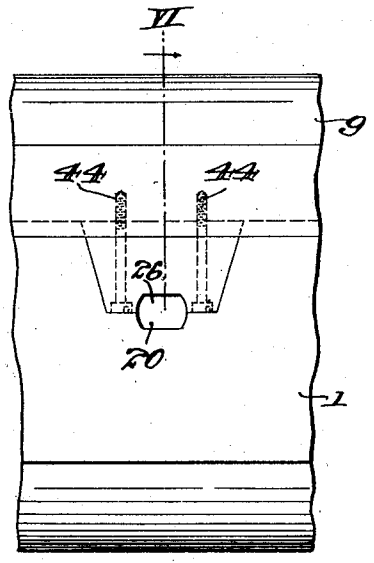


Fig. 6.

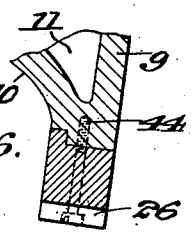
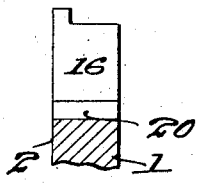


Fig. 7.



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Patented Aug. 26, 1930 1,773,810

UNITED STATES PATENT OFFICE

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VALVE-STEM-LOCKING MEANS FOR INNER-TUBE MOLDS AND THE LIKE

Original application filed May 10, 1926, Serial No. 107,902. Divided and this application filed May 12, 1928. Serial No. 277,143.

This invention relates to new and improved vulcanizing apparatus, more particularly to vulcanizing apparatus adapted for use for producing inner tubes used within outer casings or shoes to form a pneumatic vehicle tire.

The machine which forms the subject matter of the present invention is of the type in which the article to be treated is placed in a mold and the vulcanization carried on with the article confined therein.

One of the objects of the invention is to provide new and improved means for locking the valve stem of the tube in the wall of a sectional mold, the invention contemplating certain improvements over mechanism employed for a similar purpose disclosed in my United States patent Reissue No. 16,542, dated February 8, 1927.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles, constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

This application is a division of my copending application Serial No. 107,902 filed May 10, 1926.

In the accompanying drawings, wherein I have illustrated two forms of embodiments of my invention,

Figure 1 represents a plan view of the apparatus, partly broken away;

Figure 2 represents a section taken in the plane of the line II—II of Figure 1, looking in the direction of the arrows, one section of the mold being shown in two positions in full and dotted lines;

Figure 3 represents a detail elevation, partly in section, showing the valve stem locking mechanism in locked position;

Figure 4 represents a detail section, partly in elevation, showing the valve stem locking mechanism in open position;

Figure 5 represents a detail elevation showing a modified form of valve stem locking mechanism;

Figure 6 represents a detail section taken substantially in the plane of the line VI of Figure 5, looking in the direction of the arrow; and

Figure 7 represents a detail section taken in the same plane as Figure 6, but viewing the lower portion of the mold with the upper portion removed.

Before proceeding to describe the structural details of the embodiments of my invention disclosed herein, it may be noted that my invention is especially adapted for vulcanizing inner tubes formed of rubber compound where mating mold sections are employed such, for instance, as shown in my said Reissue Patent No. 16,542, and where vulcanizing gases, including air and steam, are to be introduced into the article being vulcanized through a valve stem extending inwardly through the mold wall; it being necessary that this valve stem be locked securely in the aperture of the mold wall through which it passes. In this type of mold, mating individual heated sections are employed; the lower section preferably exceeding the upper one in cross-sectional area, so that the aperture through which the valve stem extends and into which it is locked, is located wholly within the lower section of the mold.

Referring now to the drawings, the reference numeral 1 denotes the lower section, the same being provided with a circular vulcanizing channel 2 adapted to receive the inner tube 3 to be vulcanized, the latter being provided with the valve stem 4. This mold section is also provided with the usual steam chamber 5. Extending laterally from the mold section 1 is an arm 6, to which is pivoted at 7 an arm 8 of the upper mold section 9 which is likewise provided with a vulcanizing channel 10 and a steam chamber 11. The sections 1 and 9 of the mold are provided with face plates 12 and 13 respectively, the face plate 12 having squared ribs 14 which fit in correspondingly shaped recesses 15 of the upper mold section; the construction being such that, when the face plates are lying in engagement, a circular vulcanizing cavity substantially oval or elliptical in cross-

section will be provided between the mating sections of the mold. The face plates 12 and 13 are ground to such a nicety and lie in such close engagement that there is little or no chance of fin or rib being formed on the exterior surface of the tube when the latter is subjected to the vulcanizing operation.

With particular reference to the embodiment of my invention illustrated in Figures 1 to 4 inclusive, the lower section 1 is provided with a recess 16 that extends downwardly through the face plate 12 and has downwardly inclined walls 17 and 18. The bottom wall of this recess has straight portions 19, and a cavity 20 having arc-shaped portions 21 and a straight portion 22.

The reference numeral 23 denotes a block having tapered side walls 24 and 25 and rib 14', said block being so formed that it will exactly fit the recess 16 of the lower mold section when the same is locked therein, as shown in Figure 3. The upper surface of the rib 14' unites with the upper surface of the inner rib 14 so that a continuous rib is thereby formed entirely around the inner portion of the lower mold section.

The block 23 is provided with a cavity 26 having curved walls 27 and a flat wall 28 substantially corresponding to the curved walls 21 and straight wall 22 of cavity 20; the construction being such that when the block 23 is located in the recess 16 there will be formed an aperture extending through the mold wall and composed of the cavities 20 and 26; the flat sides of said aperture corresponding with the usual flat sides on valve stems and the curved portions corresponding to the curved sides usually formed on said stems.

The block 23 is mounted upon the branch 30 of a slidably mounted bracket arm 31, which is fitted to slide in a guide plate 33 which is fastened to the inner circumference of the lower mold section, as by means of screws 34. It will be seen by reference to Figures 3 and 4 that, as the bracket arm is moved upwardly, the block 23 will be lifted from the position shown in Figure 3 to the position shown in Figure 4.

Mounted upon the lower mold section 1 are the brackets 35 and 36 which form bearings for a crank shaft 37 having an arm 38 provided with a pin 39 that is received in a slot 40 formed in a forked arm 41 extending laterally from the lower end of bracket arm 31. The shaft 37 is provided with a crank arm 42 having an operating handle 43.

When the parts are in the position shown in Figure 3, with the block 23 seated in the recess 16, it will be noted that the crank shaft 37 and pin 39 are in a dead center position, and that when the crank shaft 37 is rotated through an angle of one hundred and eighty degrees (180°) to lift the block 23 to the position shown in Figure 4, a similar dead center position is established between these parts, whereby the mechanism tends to lock the block in both its lower and upper positions.

With particular reference to the modified form of my invention illustrated in Figures 5, 6 and 7, the recess 16 and cavity 20 are formed in the inner wall of the lower mold section 1 as in the first described embodiment shown in Figures 1 to 4 inclusive, and the block 23 is also the same. However, instead of mounting the block as shown in the first form, it is fixedly secured to the lower surface of the upper mold section 9, as by means of screws 44 which pass through the block 23 and are threaded into the upper section. It is, therefore, to be noted that, in this construction, when the upper section 9 of the mold is swung downwardly upon the lower section, the block 23 will be automatically positioned within the recess 16 with the valve stem extending through the aperture formed by the cavities 20 and 26. This eliminates the necessity of manipulating the mechanism for raising and lowering the block 23 as embodied in the form shown in Figures 1 to 4 inclusive.

In operating the device, when the form shown in Figures 1 to 4 inclusive is being used, the tube to be vulcanized is placed in the lower section 1 with its valve stem lying in the cavity 22, the crank 37 is then turned so as to lower the block 23 to the locking position shown in Figure 3, and the upper section of the mold closed down on the lower section, whereupon vulcanization may proceed. In operating the modified form shown in Figures 5, 6 and 7, the tube to be vulcanized is likewise placed in the lower mold section with the valve stem in the cavity 20, and then the section 9 of the mold is lowered upon the section 1, which movement of itself brings the block 23 to the seated or locking position shown in Figure 5. In both forms, the movement of the block into and out of the recess is in a direction substantially parallel to the axis of the mold as a whole although, of course, in the case of the modified form shown in Figures 5, 6 and 7, this movement is, strictly speaking, in the direction of an arc having the pivot 7 as its center. In both forms, also, this closing of the mold firmly locks the valve stem in position, which is a very important consideration during the vulcanization of the tube.

It will accordingly be seen that I have provided a construction which attains, among others, all the ends and objects above pointed out in a most efficient manner. The device is particularly adapted for use in a construction wherein the mold sections are unevenly divided, that is to say, where the mold is divided above the center so that a greater portion of the tube to be vulcanized lies within the lower section.

It will be understood that various changes

may be resorted to in the form, construction and arrangement of the several parts without departing from the spirit and scope of my invention; and hence, I do not intend to be limited to the details herein shown and described except as they may be included in the claims.

What I claim is:

1. Apparatus of the character described comprising, a plurality of mold sections adapted when placed in mating relation to form an annular vulcanizing chamber fitted to receive a tube to be vulcanized, a tapered recess formed in the inner edge of one of said sections fashioned to receive a valve stem of said tube, a tapered locking block adapted to fit into said recess for locking the valve stem therein, and means for moving said block in a direction substantially parallel to the axis of the mold sections for bringing it into and out of said recess to lock and release the valve stem.

2. Apparatus of the character described comprising, a plurality of mold sections adapted when placed in mating relation to form an annular vulcanizing chamber fitted to receive a tube to be vulcanized, a recess formed in one of said sections fashioned to receive a valve stem of said tube, a locking block adapted to fit into said recess for locking the valve stem therein, said block being carried on a member slidably mounted in a said section, and means for operating said member to move the block into and out of said recess.

3. Apparatus of the character described comprising, a plurality of mold sections adapted when placed in mating relation to form an annular vulcanizing chamber fitted to receive a tube to be vulcanized, a recess formed in one of said sections fashioned to receive a valve stem of said tube, a locking block adapted to fit into said recess for locking the valve stem therein, said block being carried on a member slidably mounted in a said section, and means for operating said member to move the block into and out of said recess, said means including crank mechanism arrangd to be on dead centers when the block is wholly out of and wholly in said recess.

4. Apparatus of the character described comprising, a plurality of mold sections adapted when placed in mating relation to form an annular vulcanizing chamber fitted to receive a tube to be vulcanized, a recess formed in the mating edge of one of said sections fashioned to receive a valve stem of said tube and being tapered in a plane substantially parallel to the axis of the mold sections, a tapered locking block fashioned to receive said valve stem and adapted to fit into said recess for locking the valve therein, said block being carried by the mold section other than the one in which the recess is formed and being adapted to be brought into and out of locking engagement with said valve stem within said recess by the normal relative motion of the sections in moving into and out of mating relation.

In testimony, that I claim the foregoing as my invention, I have signed my name this 11th day of May, 1928.

WALTER L. FAIRCHILD.

DISCLAIMER

1,773,810—*Walter L. Fairchild,* New York, N. Y. VALVE-STEM-LOCKING MEANS FOR INNER-TUBE MOLDS AND THE LIKE. Patent dated August 26, 1930. Disclaimer filed January 10, 1939, by the patentee; the exclusive licensee approving and consenting.

Hereby enters this disclaimer to claim 4 in said specification.

[*Official Gazette, February 7, 1939.*]