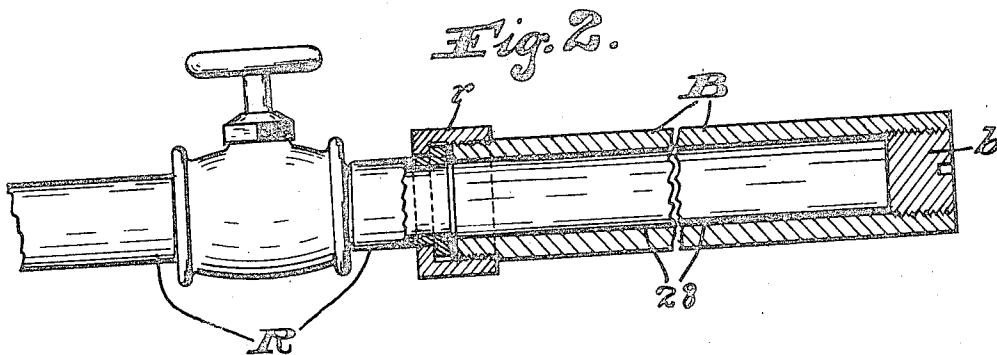
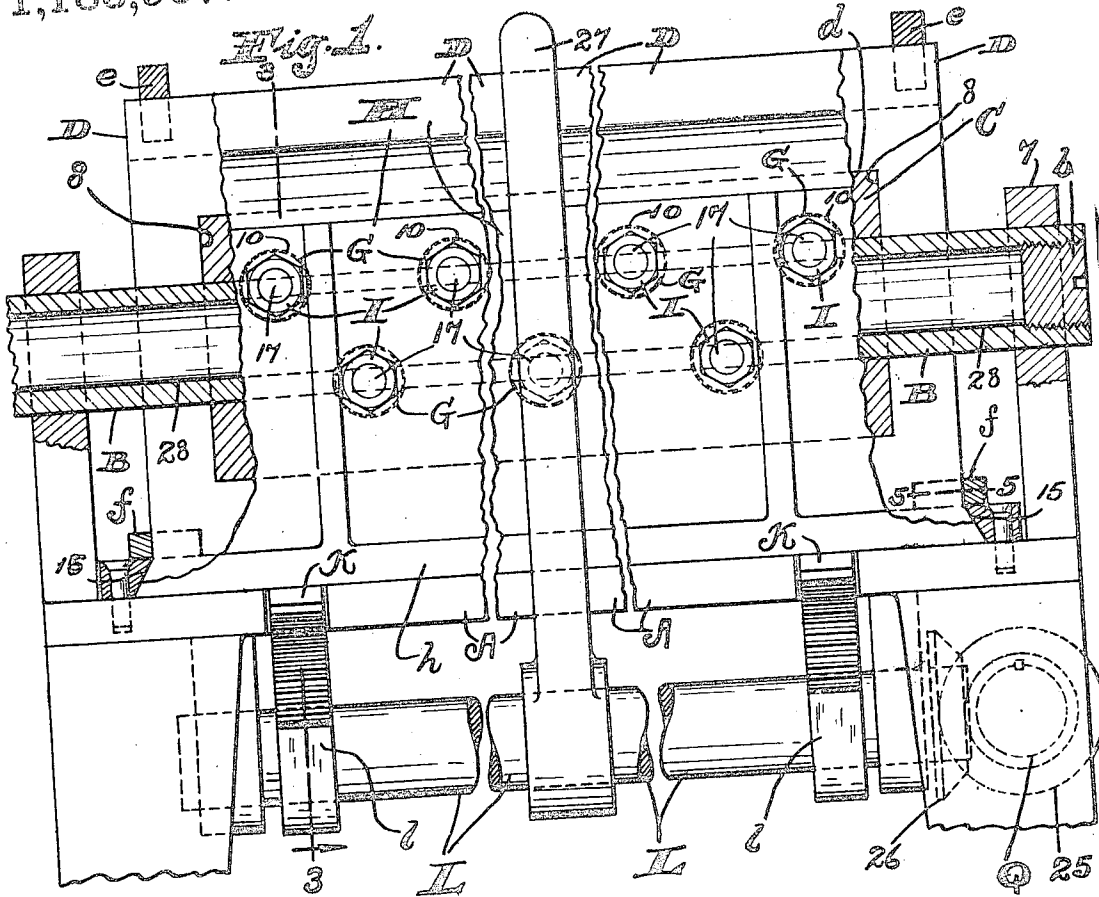


F. V. ROESEL & C. H. FRANKS.
 APPARATUS FOR MAKING CORES FOR RESILIENT WHEEL TIRES.
 APPLICATION FILED OCT. 18, 1913.

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Witnesses:
H. J. Bettins
B. C. Brown.

Inventors:
Frederick V. Roesel
and Charles H. Franks
 By *Amory*
Attorneys.

1,183,907.

Fig. 3.

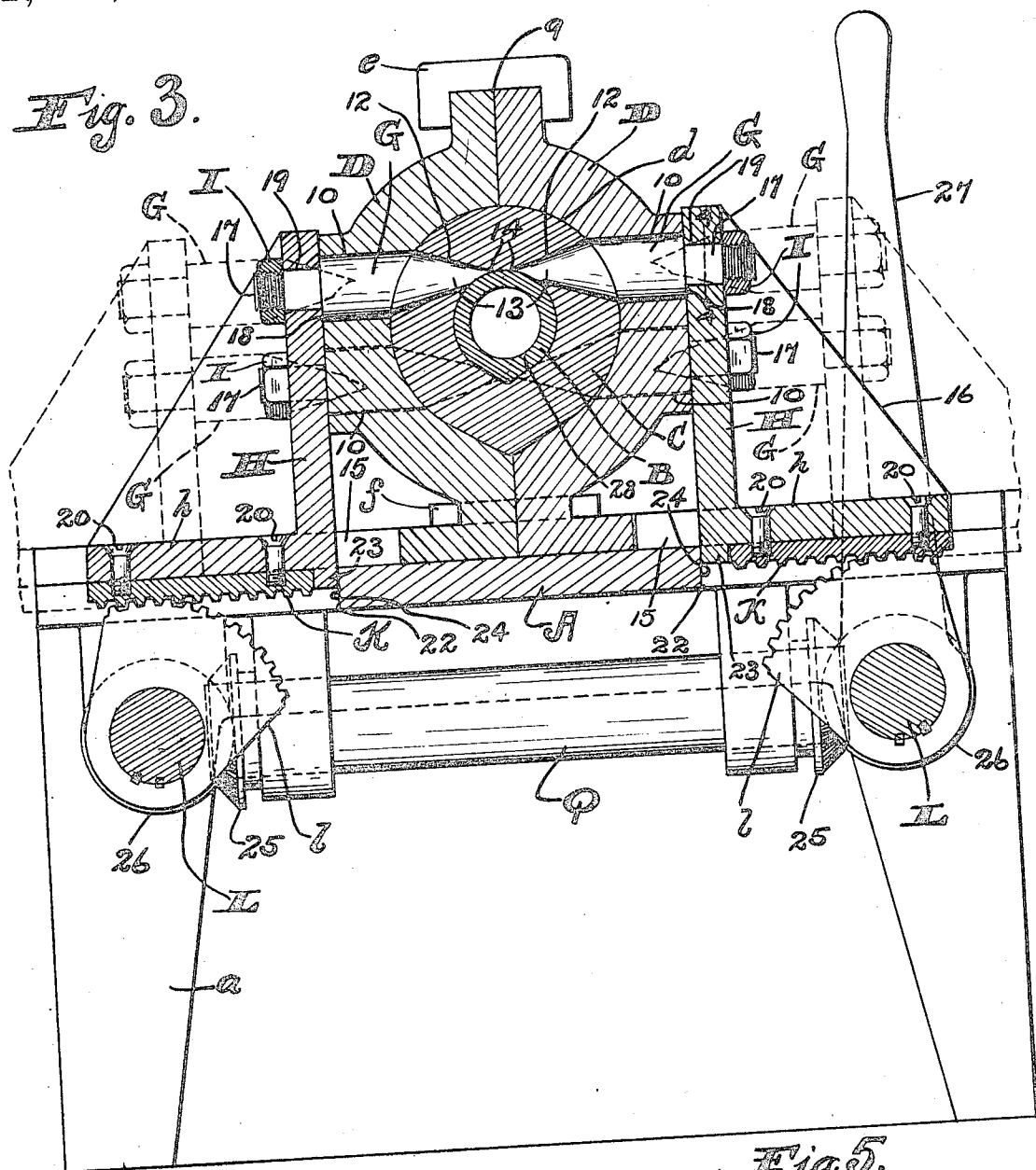
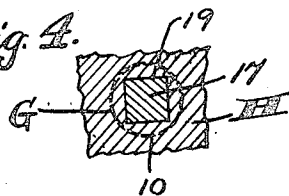
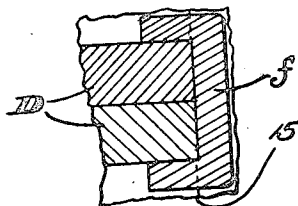


Fig. 4.



Witnesses:
 H. J. Bettino.
 B. C. Brown.

Fig. 5.



Inventors:
 Frederick V. Roesel
 and Charles H. Franks
 By *[Signature]*
 Attorneys.

UNITED STATES PATENT OFFICE.

FREDERICK V. ROESEL AND CHARLES H. FRANKS, OF AKRON, OHIO.

APPARATUS FOR MAKING CORES FOR RESILIENT WHEEL-TIRES.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, FREDERICK V. ROESEL and CHARLES H. FRANKS, citizens of the United States of America, residing at Akron, in the county of Summit, State of Ohio, have invented a certain new and useful Improvement in Apparatus for Making Cores for Resilient Wheel-Tires; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates more especially to improvements in apparatus employed in the manufacture of a laterally apertured elastic and compressible flexible tube suitable for use as a core for a compressible and elastic wheel-tire, and pertains more especially to apparatus comprising a mold-core which is to be embraced by an envelop of elastic and compressible material employed in forming a tire-core and adapted to be inclosed by a matrix preparatory to aperturing said envelop at the sides of the mold-core.

The primary object of this invention is to simultaneously compress the material forming said envelop and form outwardly flaring apertures in the sides of said envelop.

Another object is to use the aforesaid mold-core, upon compressing and aperturing said envelop, for heating and thereby vulcanizing the material composing said envelop.

Another object is to provide apparatus of the character indicated which is simple in construction, capable of being operated with facility, reliable in its operation and not liable to get out of order.

With these objects in view, and, to the end of attaining any other advantages hereinafter appearing, this invention consists in certain features of construction, and combinations and relative arrangement of parts hereinafter described, pointed out in the claims, and illustrated in the accompanying drawings.

In said drawings, Figure 1 is a side view, partly in section, of apparatus embodying our invention. Fig. 2 is a side view, in central longitudinal section, of the mold-core

employed and shows a valved pipe for supplying heating fluid to said core. Fig. 3 is a vertical section on line 3—3, Fig. 1, looking in the direction indicated by the arrow. Fig. 4 is a vertical section, in detail, on line 4—4, Fig. 3. Fig. 5 is a horizontal section in detail, on line 5—5, Fig. 1. Portions are broken away in Figs. 1 and 2 to reduce the size of the drawings.

Referring to said drawings, A indicates a table having legs *a*. Said table (see Fig. 1) is provided with two standards 7 arranged at opposite ends respectively of the table and supporting the mold-core of our improved apparatus. Said mold-core comprises a substantially horizontally arranged metal tube B which extends through the upper portion of the standards 7 and is removable endwise. Said tube is approximately circular in cross-section and shown screw-threaded internally of one end thereof, and a correspondingly externally screw-threaded plug *b* (see Figs. 1 and 2) is screwed into said tube at said end. It will be observed therefore that the mold-core comprising the tube B is arranged substantially horizontally over and longitudinally of and spaced and supported from the table A. The mold-core is shown embraced in Figs. 1 and 3 by an envelop C of elastic and compressible material, such, for instance, as unvulcanized rubber which has had the requisite preparation however for vulcanization. The mold-core is preferably coated exteriorly with any suitable substance or material, such, for instance, as soapstone, to prevent adherence to the mold-core of the tire-core-forming tube which is to be formed on the mold-core. The compressible and elastic envelop C is inclosed by a matrix which extends longitudinally of the mold-core and has an interior chamber *d* for receiving the mold-core and the elastic and compressible envelop applied to the mold-core, which chamber is approximately circular in cross-section and has end walls 8, and said matrix is divided vertically and longitudinally, as at 9, centrally between the sides of the matrix, into two separable halves or sections D. The matrix-sections D are shown held together above the chamber *d* by suitably applied remov-

able clips or members *e* contoured to overlap the outer sides of the upper portions of the matrix-sections. The matrix-sections are shown held together below said chamber by suitably applied removable clips or members *f* contoured to embrace the lower portions of the matrix-sections. The central portion of each matrix-section *D* is provided with two substantially horizontal rows of holes 10 which extend laterally through said matrix-section from the interior chamber *d* of the matrix to the exterior substantially at a right angle to the mold-core, and the holes of each row of holes alternate, as shown in dotted lines, Fig. 1, with the holes of the other row of holes.

By the construction hereinbefore described it will be observed that the matrix for inclosing the mold-core-embracing compressible and elastic envelop *C* is provided in each side thereof with holes extending laterally through said side, and that each hole in each side of the matrix is arranged in line endwise with a hole in the other side of the matrix, as shown in Fig. 3.

Each hole 10 in each matrix-section is adapted to receive a plunger *G* which in Fig. 3 is shown extending through said hole and into the envelop *C*, and said plunger is movable endwise of said hole, as will hereinafter appear, and employed in simultaneously compressing the material composing said envelop and in forming an aperture 12 in said envelop. Each plunger *G* has its forward or inner end-portion 13 tapering forwardly and is in close proximity to the mold-core when said plunger is in its extreme forward or inner position, as shown in Fig. 3. Each plunger is thick enough at the transversely larger end of its tapering portion 13 to substantially fill the inner end of the hole 10 engaged by said plunger in the extreme forward or inner position of the plunger, as shown in Fig. 3. Each plunger terminates at its forward extremity in a cutting edge 14 to facilitate the passage of the plunger into and through the adjacent side of the envelop *C*. We would here remark that all the plungers are actuated simultaneously as will hereinafter appear and during their actuation move in unison and equidistantly into or from the envelop *C* according as the plungers are actuated inwardly or outwardly. The holes 12 formed in said envelop by the plungers during the movement of the plungers into their extreme forward or inner position of course flare toward the exterior of said envelop as desired, and it will be observed that the plungers during their actuation into said envelop simultaneously compress the material composing said envelop and form apertures in said envelop.

The matrix-sections are mounted on the table *A* and engage a slideway 15 formed on and extending transversely of the table. Arranged at each side of the matrix,—that is, at the outer side of each matrix-section,—is the vertically upwardly projecting wing *H* of an angle-bar which is mounted on the table *A* and extends longitudinally of the matrix and has its other wing *h* arranged horizontally and engaging the slideway 15. Each angle-bar is provided at the outer side of its upwardly projecting wing *H* with reinforcing ribs 16 which extend between said wing and the other wing of said bar. The upwardly projecting wing *H* of each angle-bar supports or carries those plungers *G* which are arranged to move endwise of the holes 10 in the adjacent matrix-section. Each plunger *G* is shown removably secured to the upwardly projecting wing of the angle-bar carrying said plunger, and preferably provided with a horizontally arranged stem 17 which extends not only through a hole 19 formed in and extending laterally through said wing, but beyond the outer side of said wing, and said plunger is provided at the inner end of its stem with a shoulder 18 abutting against the face or inner side of said wing, and a nut *I* is screwed onto said stem at and against the outer side of said wing. The inner portion of said stem and the hole 19 engaged thereby are square or angular in cross-section, as shown in Fig. 4, so that the plunger can not become displaced circumferentially. The attachment of each plunger *G* of each angle-bar removably to said bar in the manner hereinbefore described renders said plungers replaceable by a new plunger when required.

By the construction hereinbefore described it will be observed that our improved apparatus comprises two plunger-carrying bars or plunger-carriers arranged at opposite sides respectively and externally of the matrix and capable of relative readjustment to lengthen or shorten the distance between them, and that the relative arrangement of the parts and the length of the plungers are such that the plungers have made the requisite entrance into or withdrawn from the mold-core-embracing compressible and elastic envelop *C* according as said bars or carriers have been actuated the required extent toward or from each other.

Each plunger-carrying bar is provided at the under side of its horizontal wing *h* with downwardly facing spaced racks *K* which extend transversely of said wing and are consequently parallel with the slideway 15, and each of said racks is secured, preferably removably by suitably applied screws 20, to said bar, as shown in Fig. 3. The table *A* is slotted, as at 22, to accom-

moderate the location and operation of the racks K, and each plunger-carrying bar is provided, at the inner end of each rack of the bar, with a lug 23 which projects downwardly into the slot 22 formed in the table for said rack and abuts against an end wall 24 of said slot in the extreme inner position of said bar, as shown in Fig. 3. Below the racks K of each plunger-carrier is a shaft L which is arranged horizontally and at a right angle to said racks and operatively provided with segmental gears 7 meshing with said racks. A shaft Q extends between and is arranged at a right angle to the shafts L, and two diametrically corresponding bevel-gears 25 are operatively mounted on opposite ends respectively of the shaft Q and mesh with corresponding bevel-gears 26 operatively mounted on the shafts L. One of the shafts L is provided centrally between its ends with a hand-lever 27, and the relative arrangement of the parts is such that the two plunger-carriers are actuated from or toward each other the requisite distance according as the lever-bearing shaft is oscillated in the direction and to the extent required.

In solid lines, Fig. 3, the plunger-carriers are shown in their extreme inner position in which the plungers of said carriers have entered the mold-core-embracing envelop C the maximum distance, and in said position the plunger-bearing members H of said carriers abut against the matrix and the lugs 23 abut against the end walls 24 of the slots 22. We would here remark that when the plungers are in their inner position, as shown in solid lines, Fig. 3, a heating fluid, such, for instance, as steam, is supplied to the chamber 28 formed interiorly and extending longitudinally of the mold-core so as to heat the mold-core and the rubber or material comprising the mold-core-embracing envelop C as required to vulcanize said material. The mold-core is closed at one end, as already hereinbefore indicated, but, as shown in Fig. 2, is placed in communication at its opposite end with a valved heating-agent-supply pipe R to which the mold-core is shown removably connected by a suitably applied coupling *r*. Obviously the mold-core, upon manipulating said coupling as required to detach the mold-core from the pipe R, is rendered free to be withdrawn endwise from the laterally apertured compressible and elastic tire-core-forming tube which is formed by the hereinbefore described operation on and treatment of the compressible and elastic mold-core-embracing envelop.

In dotted lines, Fig. 3, the plunger-carriers are shown in their outer position in which the plungers are wholly withdrawn from the tire-core-forming tube which has been

formed on the mold-core. The relative arrangement of the parts is such that the plunger-carriers, upon their actuation from their extreme inner position shown in solid lines Fig. 3 into their outer position shown in dotted lines Fig. 3, are far enough apart to permit, upon removing the clips *e* and *f*, of a separation of the matrix-sections D the distance required to render the elastic and compressible tube formed on the mold-core removable upwardly from between said matrix-sections upon having withdrawn the mold-core endwise from said tube after detaching the mold-core from the pipe R, and also to permit the application to the mold-core of an elastic and compressible envelop employed in forming the next tire-core to be made when the removed mold-core has been replaced in position between the separated matrix-sections. Upon having the separated matrix-sections moved into the position as shown in Fig. 1 the plunger-carriers are actuated from their outer position shown in dotted lines Fig. 3 into their inner position shown in solid lines Fig. 3. We would here remark that not unimportant is the feature of having the bars which form the plunger-carriers abutting laterally against the matrix, in the extreme inner position of said carriers, as shown in solid lines Fig. 3, so as to insure a desirable joint between the matrix-sections from end to end of the matrix in said position of said carriers.

What we claim is:—

1. In apparatus for making cores for compressible and elastic wheel-tires, a suitably supported mold-core which is to be enveloped by elastic and compressible material employed in forming a tire-core, and means for simultaneously compressing the elastic and compressible mold-core-embracing envelop and forming apertures in said envelop, the mold-core being chambered interiorly to receive a heating agent.

2. In apparatus of the character indicated, a suitably supported mold-core which is to be enveloped by elastic and compressible material employed in forming a tire-core, said mold-core having an interior chamber extending endwise of the core; means for simultaneously compressing the elastic and compressible mold-core-embracing envelop and forming apertures in said envelop, and means for supplying a heating agent to the aforesaid chamber.

3. In apparatus of the character described, a suitably supported mold-core which is to be enveloped by elastic and compressible material employed in forming a tire-core, said mold-core being chambered interiorly to receive a heating agent; a sectional matrix for inclosing the mold-core-embracing envelop of compressible and elastic material, which matrix is provided in each side thereof with

holes extending laterally through said side, plungers arranged to move endwise of said holes and extending inwardly beyond the inner ends of said holes when the plungers are in their extreme inner position, and means for reciprocating said plungers.

In testimony whereof, we sign the forego-

ing specification, in the presence of two witnesses.

FREDERICK V. ROESEL.
CHARLES H. FRANKS.

Witnesses:

B. C. BROWN,
VICTOR C. LYNCH.