

No. 717,084.

Patented Dec. 30, 1902.

J. E. DENHAM.
TIRE SETTER.

(Application filed Apr. 3, 1902.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1

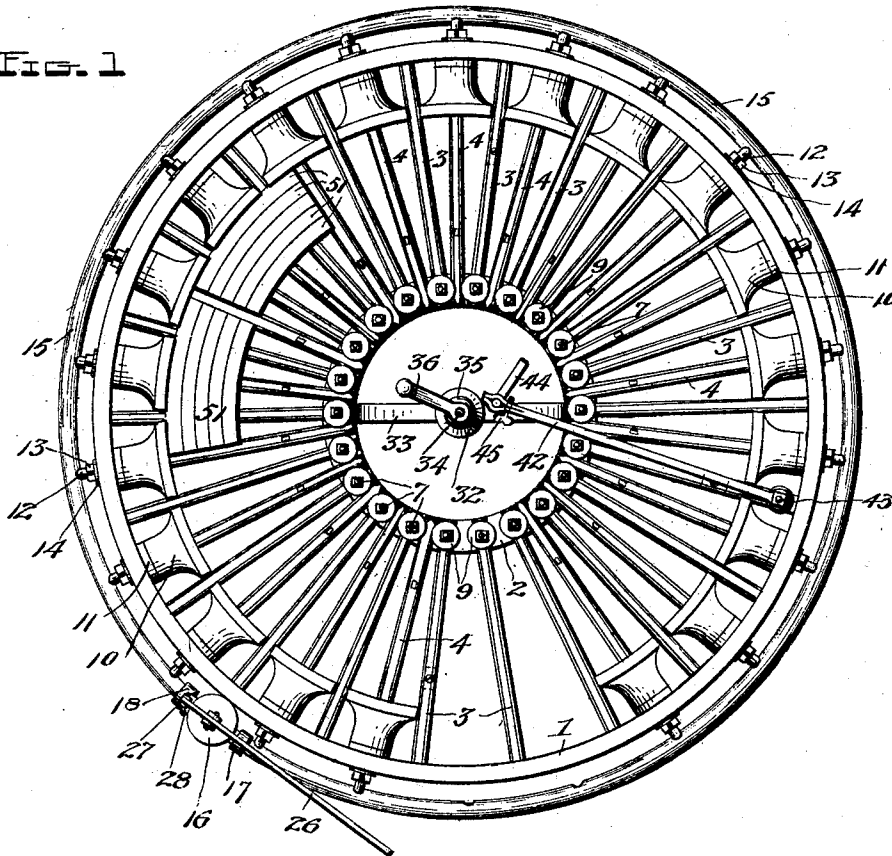
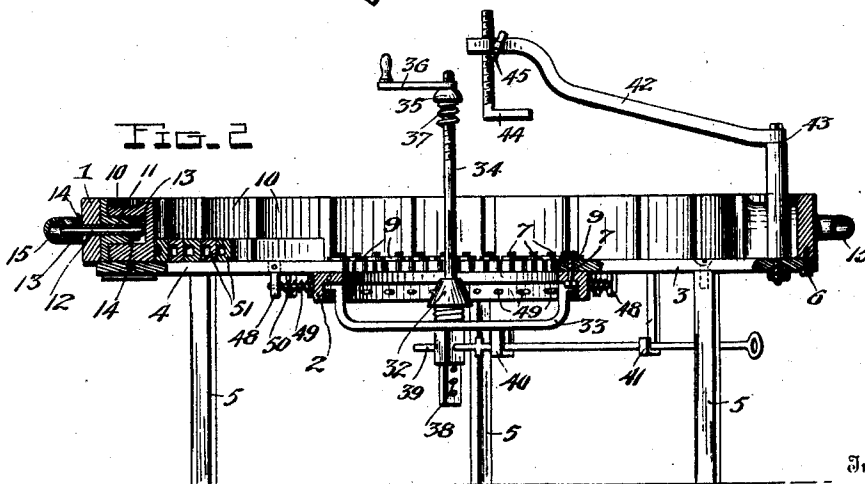


FIG. 2



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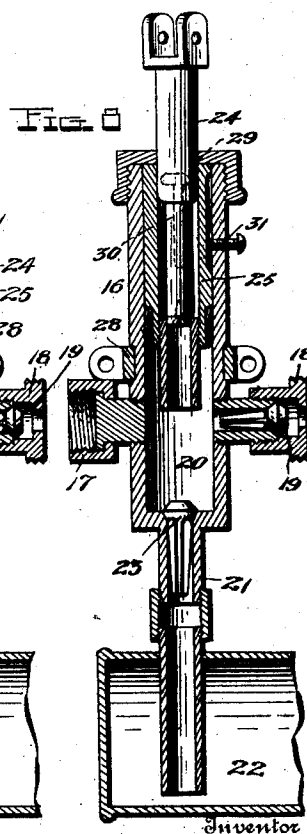
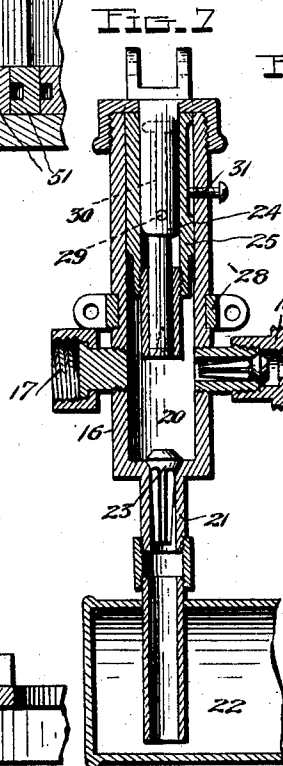
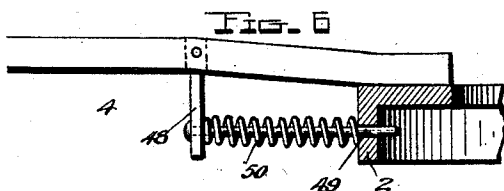
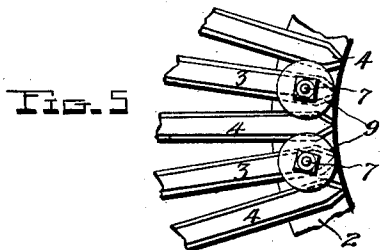
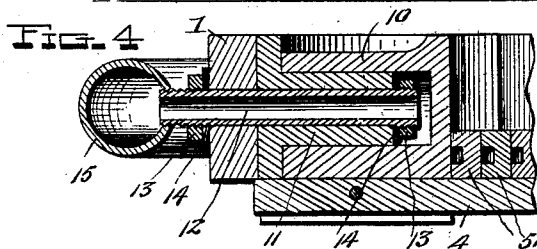
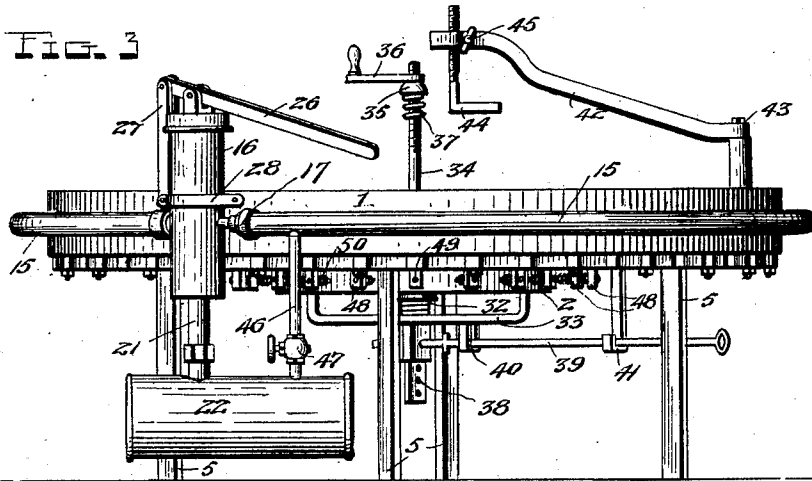
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UNITED STATES PATENT OFFICE.

JOHN E. DENHAM, OF STANBERRY, MISSOURI, ASSIGNOR OF ONE-HALF TO
J. W. DEVERO, OF CORNING, KANSAS.

TIRE-SETTER.

SPECIFICATION forming part of Letters Patent No. 717,084, dated December 30, 1902.

Application filed April 3, 1902. Serial No. 101,271. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. DENHAM, a citizen of the United States, residing at Stanberry, in the county of Gentry and State of Missouri, have invented certain new and useful Improvements in Tire-Setters; and I do 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 appertains to make and use the same.

This invention relates to improvements in tire-setters.

The object of the invention is to provide a machine for setting cold tires upon wheel-rims, which machine shall be simple of construction, comparatively inexpensive of production, and efficient in operation, and, further, to provide simple and effective mechanism for supplying a fluid under pressure for actuating plungers which force the tire in position upon the wheel-rim.

With this and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a tire-setter embodying my invention, parts being broken away and removed in order to clearly disclose the general construction. Fig. 2 is a central vertical section. Fig. 3 is a side elevation. Fig. 4 is a detail longitudinal section through one of the plungers and associate parts. Fig. 5 is a detail top plan view of one of the sliding bars and the contiguous bars, showing the arrangement of the washers. Fig. 6 is a fragmentary side elevation of one of the sliding arms, showing the inner supporting-ring and the retracting-spring. Figs. 7 and 8 are sectional views of the pump, showing the parts adjusted, respectively, for using one or both pistons.

Referring now more particularly to the drawings, the numerals 1 and 2 represent outer and inner flanged rings, which, in conjunction with fixed and sliding rods or bars 3 and 4, form the frame and bed of the machine for supporting the wheel-rim and the tire to be set thereon. The frame is mounted at a suit-

able elevation on supporting-legs 5. The bars 3 and 4 extend radially in alternation around the frame and between the rings and rest at their inner ends upon the upper surface of the ring 2, the bars 3 being fixed at their outer ends to the ring 1 by suitable fastenings 6 and at their inner ends to the ring 2 by bolts 7, upon which are fitted washers 9. The inner ends of the bars 4 slide upon the upper surface of the ring 2 and are retained in position and prevented from moving upwardly by the washers 9 on the bolts of the contiguous bars 3, which washers overlap the said bars 4, as clearly shown in Fig. 5. The outer ends of the bars 4 are connected to the plungers 10, which act in the nature of presser-blocks to force the tire into position on the rim in the usual manner. The plungers 10 extend in a circle around the inner circumference of the ring 1 and have slightly-curved or segmental faces to conform to the shape of the tire. Each plunger consists of a chambered block, which fits and slides on a guide 11, through which passes a feed tube or pipe 12, which also extends through the vertical flange of the ring 1. This pipe is threaded at its ends to receive nuts 13, which hold the guide and pipe fixed upon the ring 1, and between these nuts and the ring and inner end of the guide are packing-washers 14, which prevent leakage of the fluid used for forcing the plungers inwardly.

Extending around the outer circumference of the ring 1 is an annular supply-pipe 15, which is in communication with the several feed pipes or tubes 12 and is designed to supply the oil or other impelling medium thereto to effect the inward movement of the plungers 10. One end of this supply-pipe 15 is connected with the cylinder of the pump 16 by a coupling 17 and is not in communication with said cylinder, while the other end of the pipe is connected to and is in communication with the cylinder through the medium of a coupling 18, the flow of oil from the cylinder to said pipe being controlled by an outwardly-movable check-valve 19, which is adapted to seat against a seat formed upon the outer surface of the coupling 18.

The pump-cylinder 20 is connected at its lower end by means of a pipe 21 with a tank or reservoir 22, adapted to contain oil, water,

or any other desired fluid which is to be forced under pressure into the pipe 15 and thence through the pipes 12 to actuate the plungers 10. A check-valve 23, located in the bottom portion of the pump-cylinder, is adapted to move upwardly to permit of the flow of oil from the reservoir to the cylinder and then to close by gravity to prevent the oil from flowing back from the cylinder into the reservoir.

The pump-cylinder contains two pistons 24 and 25, the piston 25 being hollow or tubular in order to receive the piston 24, which operates therein. The piston 24 is connected at its outer or upper end to an operating-lever 26, which is fulcrumed by a link 27 to a collar or band 28, suitably secured upon the outside of the cylinder. The piston 24 is adapted to be operated alone or in conjunction with the piston 25 in order to enable a less or greater quantity of oil to be supplied to the pipe 15 for the purpose of actuating the plungers 10, and to this end it is provided with a pin 29, which fits within a T-shaped slot 30, formed in the wall of the piston 25, the pin 25 and slot constituting a clutch connection between the pistons whereby they may be released from engagement to permit the piston 24 to be operated alone or the two pistons connected to be simultaneously operated.

When it is desired to force a large quantity of the impelling fluid into the pipe 15, as at the outset of the operation, when it is desired to effect the quick action of the plungers, the piston 24 is drawn upwardly until the pin 29 occupies the upper cross portion of the slot 30, when it is given a slight turn or axial movement to cause the pin to occupy one of the ends of said cross portion and to bear against the walls thereof, when the two pistons will be coupled together to move in unison. By then operating the lever both the pistons will be reciprocated to draw oil up from the tank or reservoir 22 and to force the same into the pipe 15 and thence through the feed-pipes 12, thus supplying a large quantity of fluid on each stroke in order to effect the quick priming of the apparatus and the operation of the plungers. After the plungers have been adjusted to the desired extent and are in engagement with the tire and it is desired to regulate the pressure upon the tire with accuracy the piston 24 is disconnected from the piston 25 by withdrawing the pin 29 from engagement with the cross portion of the slot 30 and allowing it to drop down into the vertical portion of said slot. The lever 26 may then be operated to reciprocate the piston 24 alone to force a relatively small quantity of the impelling fluid on each stroke into the pipe 15 and to the plungers until the desired pressure on the plungers is attained and the tire is held with the desired force against the wheel-rim. By this means overpressure on the tire and rim may be avoided and undue dishing of the wheel prevented.

It will be readily understood from the fore-

going description that when the piston 24 is employed independent of the piston 25 the latter piston serves as a bushing to decrease the bore, and consequently the capacity of the pump, so that a lesser supply of the impelling fluid may be forced into the pipe 15.

The piston 25 is held from turning in the cylinder by a screw 31, which engages a groove in the outer surface of said piston.

The wheel and tire are supported in practice on the bed formed by the radial rods or bars 3 and 4 and are centered and held in proper position by a centering cone or hub support 32, which is fixed to a yoke or bridge-piece 33, bolted or otherwise suitably secured at its ends to diametrically opposite sides of the ring 2. This cone is hollow or tubular and has slidably fitted therein a stem 34, which is threaded at its upper end to receive a nut 35, having a crank 36, by means of which it may be readily and conveniently tightened or loosened or disengaged to permit of the application of the wheel. When the wheel is placed in position upon the bed, the nut 35 is removed and the wheel placed upon the bed with the stem 34 projecting through the hub and the cone 32 entering the lower side or end of the hub. The nut 35 is then applied and tightened to bear against the upper surface of the hub to hold the wheel centered. If desired, a coil-spring 37 may be applied to the stem so as to be interposed between the upper end of the hub and the nut to form a yielding connection between them to prevent too much pressure from being exerted and to limit the dishing action. The lower end of the stem has formed therein a series of apertures 38 to receive a fastening-pin 39, which projects through openings in the lower end of the centering-piece 32 and is adapted to be passed through one of said apertures for holding the stem in fixed position. By means of this pin and the said series of apertures the stem may be adjusted as desired to correspond to the size or length of the wheel-hub. The inner end of the stem moves within a suitable guide 40 and rests its outer end in a keeper 41 and is provided with any preferred form of handle for convenience in manipulating it.

In order to enable the dish of the wheel to be readily determined, a gage-bar 42 is provided and is pivoted at 43 to the outer end of one of the bars 3 to swing into and out of position to enable the wheel to be applied and removed without interference. The inner end of this gage-bar is split or bifurcated to receive the vertical stem of an L-shaped gage 44, by which the dish of the wheel may be readily determined. This gage is clamped in position by a screw 45, which is adapted to draw the arms of the bifurcated portion of the bar together.

In the operation of the device the wheel and tire are placed in position upon the bed formed by the arms 3 and 4 and locked by the adjustment of the nut 35, the gage swung

into position, and the pump then operated to supply oil under pressure from the tank or reservoir 2 to the pipe 15, from which it flows through the feed pipes or tubes 12 into the plungers 10 and forces said plungers inwardly and radially toward the center of the frame, and this action is continued until the plungers have been adjusted to bear with the desired pressure against the tire to set it upon the rim. After the operation of setting the tire has been completed the oil is allowed to exhaust from the plungers and supply-pipe back into the tank or reservoir 22 through an exhaust-pipe 46, which is provided with a controlling-valve 47, which cuts off communication between the supply-pipe and tank. The retraction of the plungers is effected through the medium of retracting-springs acting on the sliding bars 4, which are, as before stated, fixed to the plungers to slide therewith. Each bar 4 is provided with a downwardly-extending lug or arm 48, which is connected to the vertical depending flange of the ring 2 by a pin or rod 49, which has a sliding engagement with said flange, and surrounding this pin or rod is a coiled retracting-spring 50, which bears against the arm and flange and is compressed by the inward movement of the plunger and rod and serves by its expansive energy when the impelling fluid is withdrawn from the supply-pipe and exhausted back into the tank to retract the plunger to its normal position. When the wheel on which the tire is to be set is too small to be directly engaged by the plungers, sectional segmental blocks 51 are employed between the tire and plungers to occupy the space between them and to transfer the force or pressure of the plungers to said tire in a manner readily understood.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of my improved tire-setter will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a tire-setter of the character described, the combination with a frame or bed; of plungers radially movable upon said frame or bed, means for supplying an impelling fluid under pressure for moving the plungers inwardly, and springs for retracting the plungers, substantially as described.

2. In a tire-setter of the character described, the combination with a frame or bed; of a series of radially-movable plungers, means for supplying a fluid-impelling medium for moving said plungers inwardly, radial slidable bars connected to the plungers, and springs

acting on said bars for retracting the plungers, substantially as specified.

3. In a tire-setter of the character described, the combination of a frame comprising inner and outer rings, a series of radial bars fixed to said rings, a second series of sliding bars alternating with the fixed bars and cooperating therewith to form the bed of the frame, plungers connected to the sliding bars, means for supplying a fluid-impelling medium for forcing the plungers inwardly, and springs acting on said sliding bars for retracting the plungers, substantially as set forth.

4. In a tire-setter of the character described, the combination with a frame or bed, plungers, and means for projecting and retracting the plungers; of a supporting-yoke, a hub-centering cone rigidly connected to the yoke, a stem sliding in the cone, means for forcing the stem in adjusted position, and means cooperating with the stem for clamping the wheel-hub, substantially as described.

5. In a tire-setter of the character described, the combination with a frame or bed; of radially-movable plungers, a source of supply for a fluid-impelling medium, and a pump for supplying the said impelling medium under pressure to act upon the plunger, said pump having a plurality of pistons, one movable within the other, and a clutch connection whereby the pistons may be disengaged to operate one independently of the other or engaged to operate both in unison, substantially as and for the purpose set forth.

6. In a tire-setter of the character described, the combination with a frame or bed; of radially-movable plungers, a source of supply for a fluid-impelling medium, and a pump for forcing the said medium under pressure to the plungers, said pump being provided with a pair of pistons movable one within the other, the inner piston being provided with a pin to engage a T-shaped slot in the other piston, whereby one of the pistons may be operated independently of the other or both pistons operated in unison, substantially as described.

7. In a tire-setter of the character described, the combination of a supporting frame or bed, a series of radially-movable plungers, a pipe for supplying fluid to the plungers to move them inwardly and radially toward the center of the bed, a fluid-supply tank, a pump connected with the tank and supply-pipe and provided with suitable check-valves, a draw-off connection between the supply-pipe and the source of fluid-supply, and means for retracting the plungers, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN E. DENHAM.

Witnesses:

RAY W. HALSTEAD,
JOHN J. ENYART.