J. C. THEBERATH.

RIM COLLAPSING TOOL.

APPLICATION FILED MAY 10, 1920.

1,410,140.

Patented Mar. 21, 1922.

2 SHEETS—SHEET 1.

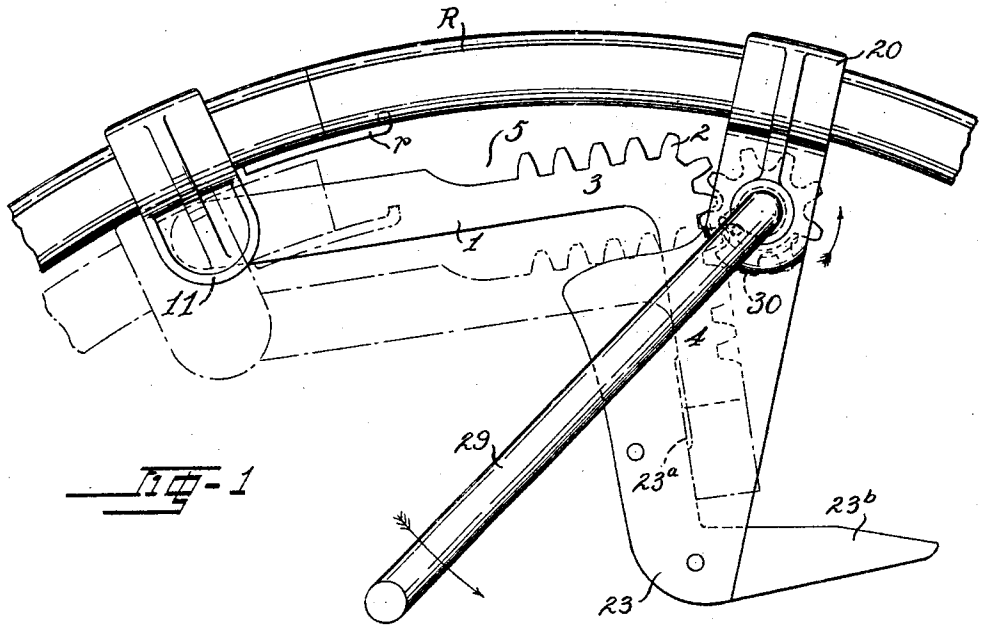

Fig. 1

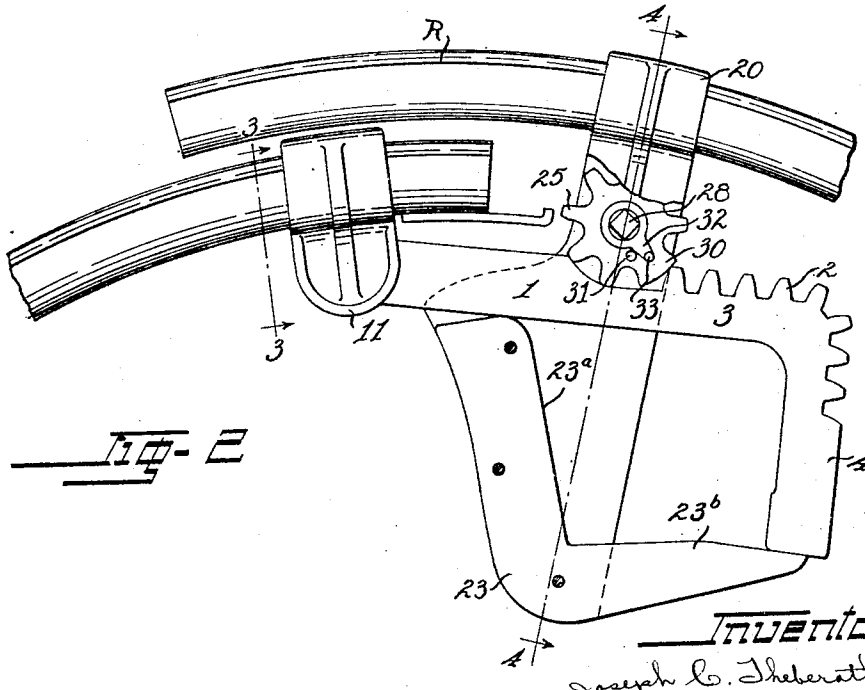

Fig. 2

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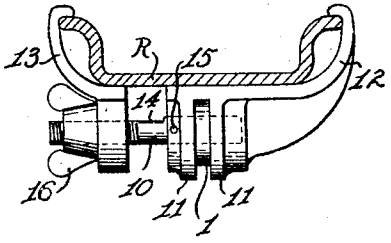
2 SHEETS—SHEET 2.

Fig-3



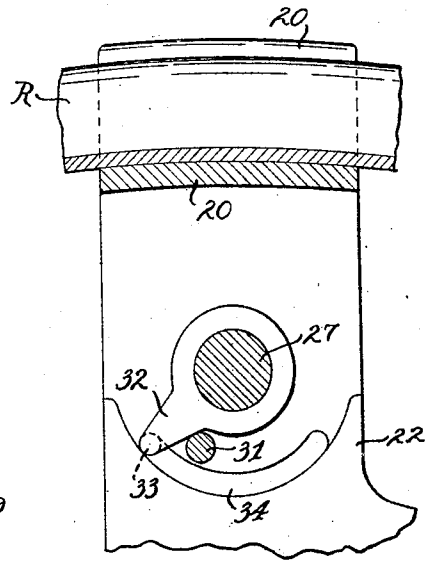


Fig-5

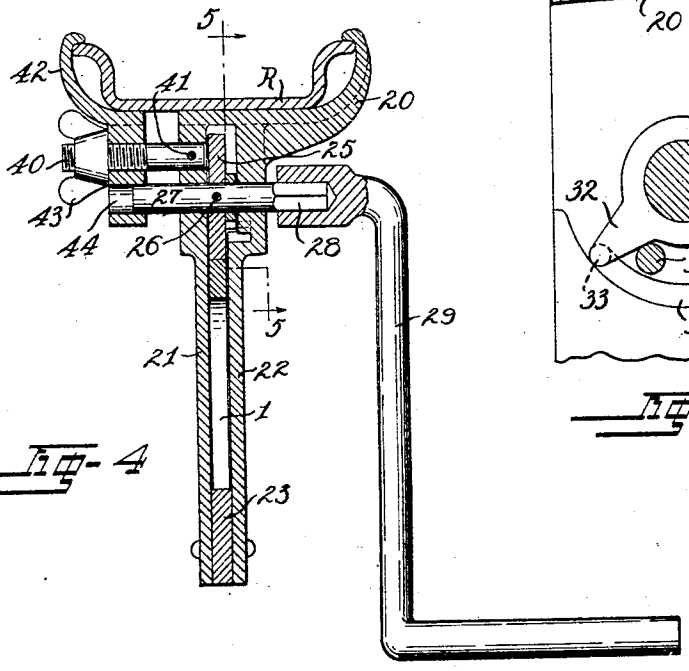


Fig-4

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RIM-COLLAPSING TOOL.

1,410,140. Specification of Letters Patent. Patented Mar. 21, 1922.

Application filed May 10, 1920. Serial No. 380,049.

To all whom it may concern:

Be it known that I, JOSEPH C. THEBERATH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Rim-Collapsing Tools, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to improvements in that class of devices known as rim collapsing tools and it has for its primary object the production of a device of this character that may be quickly and conveniently applied to the rim, and easily actuated by a continuous movement of its operating handle in one direction to break the joint between the rim ends, draw one end substantially radially inward beyond the plane of the other and overlap it with respect thereto for a material distance, and finally lock the rim in such collapsed condition against accidental recoil toward which there is a strong tendency due to the high tension under which the rim is thus placed; and then, by a like movement of the operating handle in a reverse direction, to retrace the foregoing steps and thereby expand the rim to its normal condition.

Further objects are to provide a tool of the foregoing nature that is very strong and durable; comparatively simple of construction; positive of operation; adjustable to rims of various sizes; and through which ample power may be created to handle the largest and stiffest of rims at the expenditure of comparatively slight physical exertion.

Other objects will become apparent as I proceed to describe the embodiment of my invention illustrated in the drawings accompanying and forming a part hereof, and notwithstanding the specific description of this embodiment, it will be understood that I do not limit myself to the details thereof further than is required by the terms of the annexed claims and the state of the prior art.

In the drawings, Fig. 1 is a fragmentary side elevation of a rim having the tool applied thereto, the full lines showing the rim in normal condition, while the dotted lines show one end of the rim drawn inwardly beyond the plane of the other; Fig. 2 shows the rim collapsed and locked in such condition by the tool, parts of the tool being broken away to reveal certain structural details; Figs. 3 and 4 are transverse sections on the respective lines 3—3 and 4—4 of Fig. 2; and Fig. 5 is an enlarged sectional detail on the correspondingly numbered line of Fig. 4.

In general, the tool comprises a pair of elements that are adapted to be clamped to the adjacent end portions of a transversely split rim, one element involving a rack, and the other supporting a pinion for cooperation with the rack and incorporating a guide for directing the course of the rack as it is actuated by the pinion to impart to the rim end to which the rack is attached an inward and then circumferential movement. While I have specified a rack and pinion, any elements cooperating to accomplish the same results are to be regarded as the full equivalents thereof.

The rack, which is designated 1, is substantially L-shaped and on its outer side, where its branches join, it is provided with a series of teeth 2. For convenience of description, its longer and shorter branches will be referred to as the "circumferential" and "radial" portions, 3 and 4, respectively. It will be noted that the teeth do not extend to the end of the "radial" portion; and that they terminate about midway of the "circumferential" portion where the rack is cut away to produce an elongated pocket 5. The rack is pivoted on a stud 10 between ears 11 of a clamping jaw 12 toward and from which an opposed jaw 13 is movable along the protruding end of the stud, (see Fig. 3). The stud is flattened along one side, as indicated at 14, and it may be explained that the aperture in the jaw 13 corresponds substantially to the cross sectional shape of this portion of the stud so that appreciable relative angular movement is prevented. The stud is shown as held against turning with respect to jaw 12 by a pin 15. A thumb nut 16 is screwed onto the threaded outer end of stud 10 for actuating the clamp to secure it to one end of the rim designated R.

The foregoing parts constitute one of the elements hereinbefore referred to. The other is composed of a clamping jaw 20 that carries a pair of side plates 21 and 22 between which the rack 1 extends for cooperation with a guide 23 supported between the inner ends of the plates, and with a pinion 25 situated between the outer ends of the plates, and that is secured as by means of a pin 26 to a shaft 27, journaled within

the thickened outer end portions of the plates and which is squared where it protrudes beyond one, as indicated at 28, for the application of the socketed end of an operating handle 29 (see Fig. 4). The pinion has an enlarged tooth 30 and carries a pin 31 for engagement with a stop 32 that is journaled on the shaft 27 between the pinion and the side plate 22, the stop having a lug 33 on its inner end which plays within a segmental slot 34 in the inner face of the plate 22 (Fig. 5). This stop, through the engagement of pin 31 with it, limits the angular movement of the pinion to something more than a complete circle.

Projecting from the plate 21 is a stud 40 that is shown as having its inner end secured within an aperture of the plate by a pin 41. A clamping jaw 42 is applied to the stud 41 and is adapted to be adjusted therealong by a thumb nut 43 screwed onto the threaded end of the stud. The jaw is held against angular movement upon the stud by the projecting end of shaft 27 which is engaged within a hole 44 of the jaw.

The method of connecting the device to the rim is obvious from the foregoing description. With the tool applied as in Fig. 1, the operating handle 29 may be rotated in the direction of the arrow to move the rack 1 inwardly along what may be regarded the "radial" portion 23^a of the guide 23, such portion being so termed because its function is to restrict the movement of the end of the rim to which the rack is clamped to a substantially radial course. During this movement, the joint between the ends of the rim is broken and the latch r is withdrawn from its receiving slot or socket in the other end portion of the rim, the first mentioned end being forced away from and then drawn inwardly beyond the circumferential plane of the other end. The inner end of the "radial" portion of the rack now engages the laterally extending portion 23^b of the guide, and, simultaneously therewith, the pinion starts meshing with the teeth on the "circumferential" portion of the rack. During the remainder of the rotation of the pinion, the end of the rack is fed along the laterally extending branch 23^b of the guide to impart to the rim end to which the rack is connected a circumferential movement. This action continues until the enlarged tooth 30 of the pinion enters the pocket 5 and engages the last tooth of the rack and forces it beyond the radius of the pinion, causing said tooth to engage end-on with the enlarged tooth of the pinion. This serves to block retraction of the rack by the recoil tendency of the rim, the pinion being stopped in such position by the engagement of its pin 31 with the stop 32.

In its collapsed condition, the rim may be handled as roughly as occasion requires without danger of its springing back to normal size. With the rim in collapsed condition, the tire may be easily removed and replaced, after which a reverse rotation of the operating handle will return the parts to normal condition with the ends of the rim engaging and the latch r interlocked with its retaining slot or recess.

It may be explained that the initial operation of the tool is to actually separate the rim ends by slightly expanding the rim; and this same situation prevails at the final step of the operation of the tool when returning the rim to its normal condition. This makes the tool especially suitable for handling rims having circumferentially extending interlocking tongues and grooves at their abutting ends, an example of such being found in that type known as the "Kelsey" rim.

Having thus described my invention, what I claim is:

1. In a rim collapsing tool, the combination of a pair of elements designed for attachment respectively to the opposite end portions of a split rim, a rack connected to one element, a pinion carried by the other element and wherewith the rack engages, means for rotating the pinion, and means for restricting the rack to a given course of movement, the pinion having an enlarged tooth and the rack a cut-away portion through which the enlarged tooth is adapted to swing and thus be brought into substantially end-on engagement with the adjacent tooth of the rack when the rim is in collapsed condition.

2. In a rim collapsing tool, the combination of a pair of elements designed for attachment respectively to the opposite end portions of a split rim, a rack connected to one element, a pinion carried by the other element and wherewith the rack engages, means for rotating the pinion, means for restricting the rack to a given course of movement, the pinion having an enlarged tooth and the rack a cut-away portion into which the enlarged tooth is adapted to swing and thus be brought into substantially end-on engagement with the adjacent tooth of the rack when the rim is in collapsed condition, and a stop for limiting the rotation of the pinion.

3. In a rim collapsing tool, the combination of a clamp for attachment to one of the end portions of a split rim, a rack pivotally connected to the clamp, a frame incorporating a clamp for attaching it to the other end portion of the rim, a pinion mounted within the frame, means for rotating the pinion, the rack comprising a so-called circumferential portion and a so-called radial portion and a guide carried by the frame and having portions corresponding to the aforesaid portions of the rack and serving to

maintain the rack in mesh with the pinion and guide it in its movement to draw the end of the rim to which the rack has connection substantially radially inwardly and then circumferentially to overlap it with respect to the other end portion.

4. In a rim collapsing tool, the combination of a clamp for attachment to one of the end portions of a split rim, a rack pivotally connected to the clamp, a frame incorporating a clamp for attaching it to the other end portion of the rim, a pinion mounted within the frame, means for rotating the pinion, the rack comprising a so-called circumferential portion and a so-called radial portion, a guide carried by the frame and having portions corresponding to the aforesaid portions of the rack and serving to maintain the rack in mesh with the pinion and guide it in its movement to draw the end of the rim to which the rack has connection substantially radially inward and then circumferentially to overlap it with respect to the other end portion, and means for locking the parts in a condition to maintain the rim collapsed against accidental expansion in response to the recoil tendency of the rim.

5. In a rim collapsing tool, the combination of a pair of elements designed for attachment respectively to the opposite end portions of a split rim, a rack connected to one element, a pinion carried by the other element and wherewith the rack engages, means for rotating the pinion, and a guide on the pinion carrying element and wherewith the rack engages for restricting the rack to a given course of movement whereby the end of the rim to which the rack has connection is caused to move inwardly and circumferentially.

In testimony whereof, I hereunto affix my signature.

JOSEPH C. THEBERATH.