

J. W. BRAND.
APPARATUS FOR MOUNTING OR REMOVING PNEUMATIC TIRES.
APPLICATION FILED NOV. 21, 1917.

1,353,020.

Patented Sept. 14, 1920.
5 SHEETS—SHEET 1.

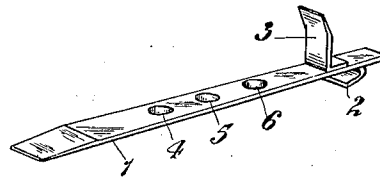


Fig. 1.

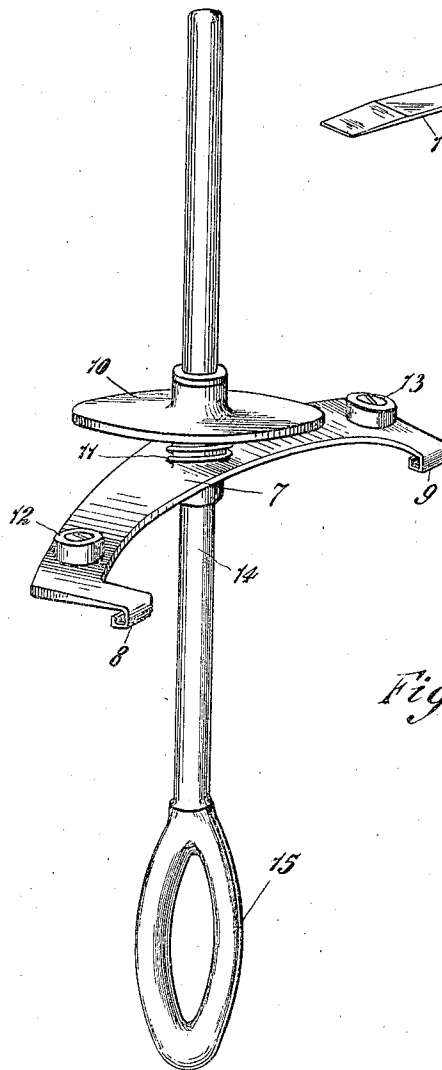


Fig. 2.

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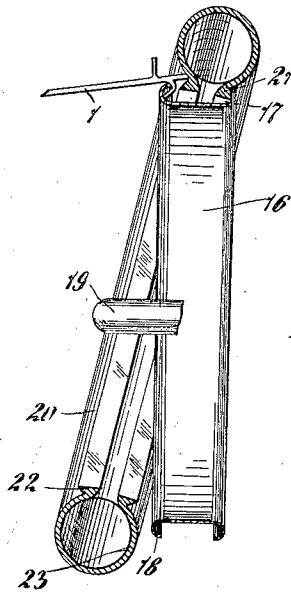


Fig. 3.

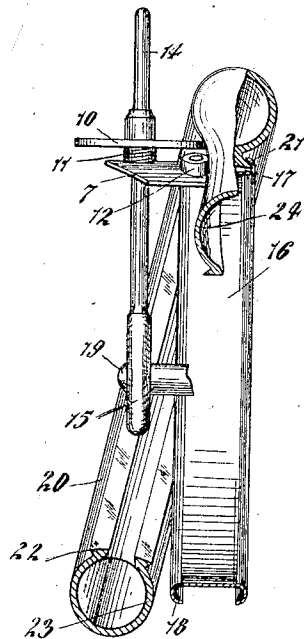


Fig. 4.

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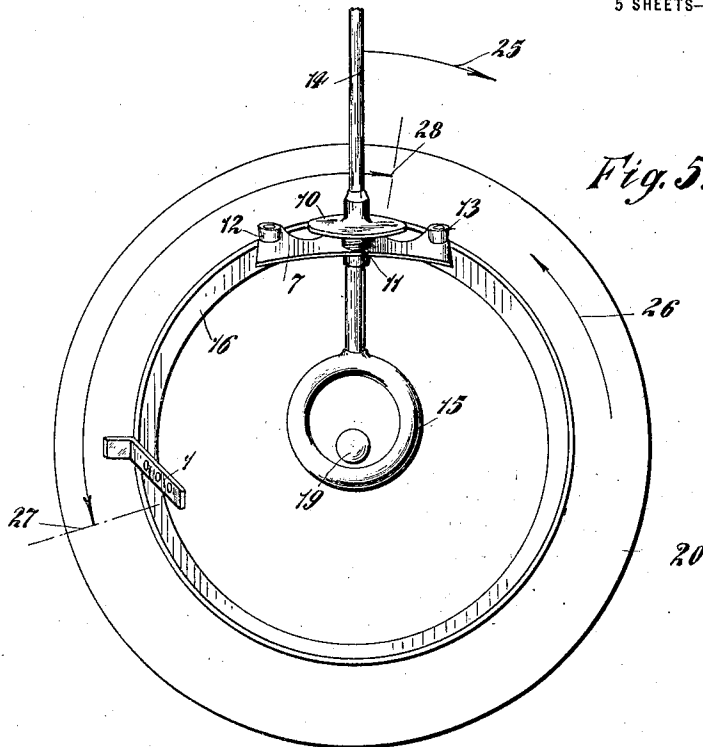


Fig. 5.

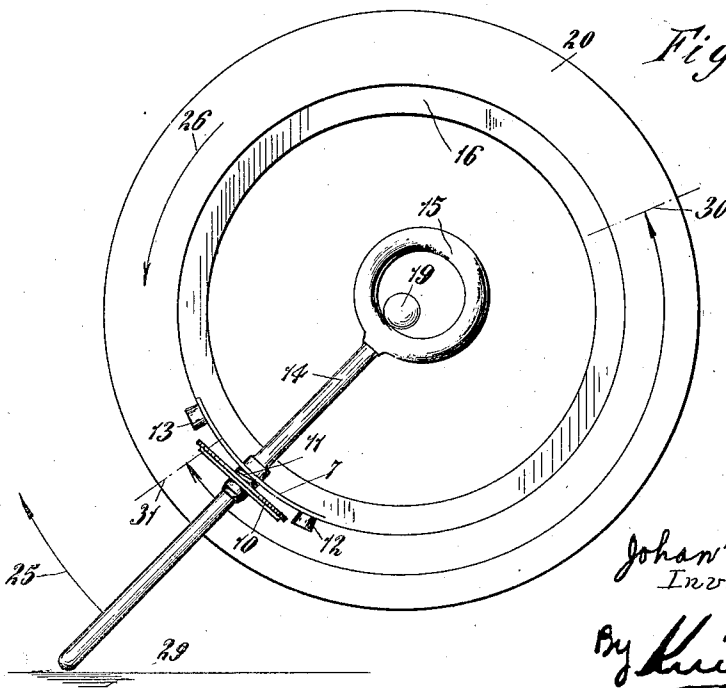


Fig. 6.

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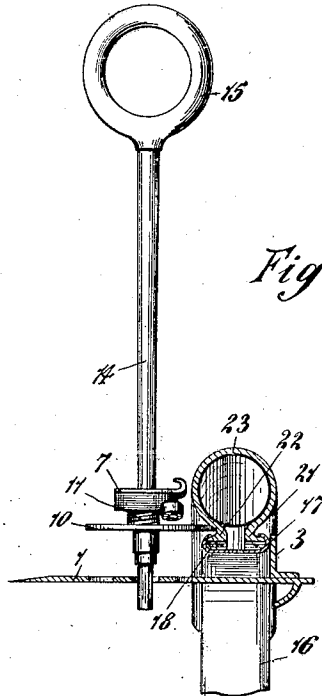


Fig. 7.

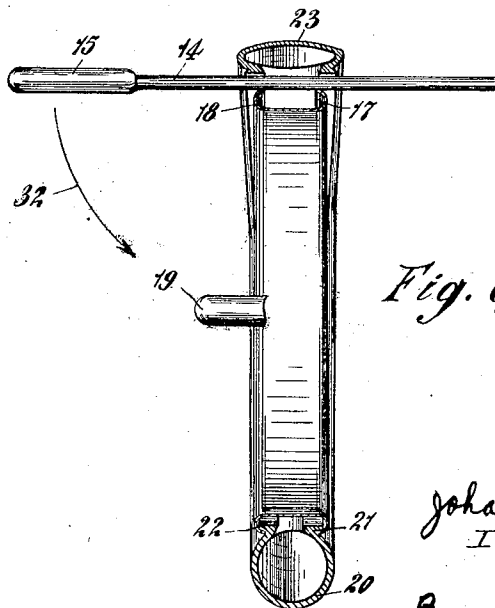


Fig. 8.

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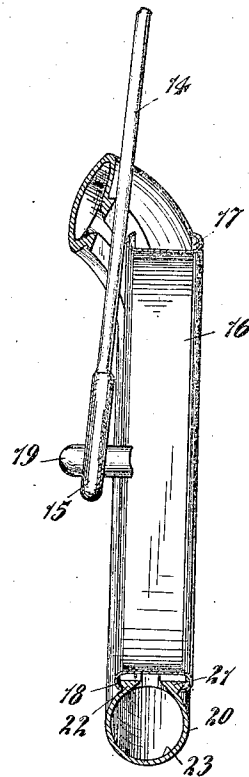
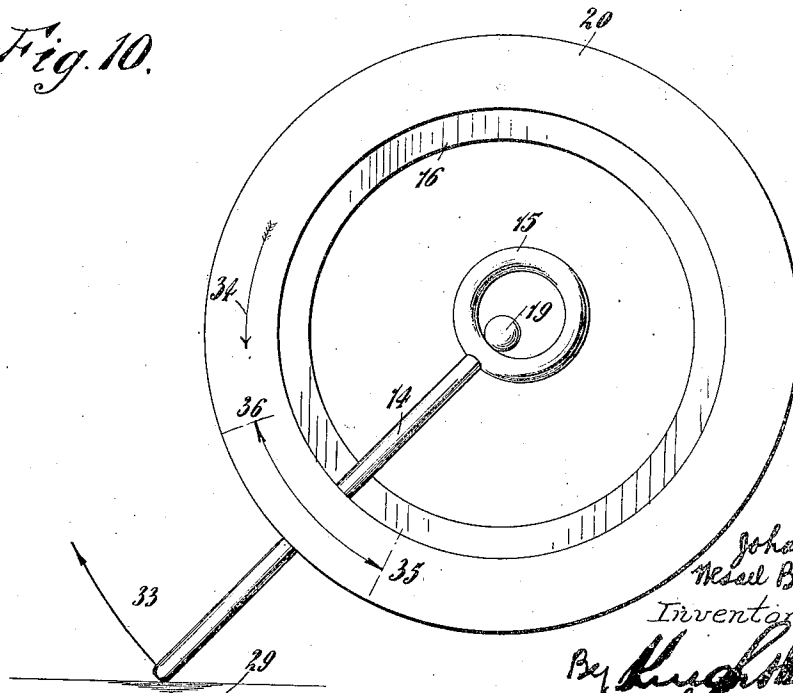


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MOUNTING OR REMOVING PNEUMATIC TIRES.

1,353,020.

Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed November 21, 1917. Serial No. 203,176.

To all whom it may concern:

Be it known that I, JOHAN WESSEL BRAND, engineer, a subject of the Queen of the Netherlands, and residing at The Hague, the Netherlands, have invented certain new and useful Improvements in Apparatus for Mounting or Removing Pneumatic Tires, of which the following is a specification.

The present invention relates to improvements in or with reference to apparatus for mounting or removing pneumatic tires.

In particular this invention relates to an apparatus by means of which tires may be properly and quickly mounted on a rim or be removed therefrom, the said apparatus having the following characteristic features:

1. The apparatus does not comprise any driving arrangement with gear wheels or the like.

2. The beads of the cover which inclose the air tube are fitted in place or removed simultaneously.

3. The fitting and removal is effected by means of a lever, one end of which engages the hub of the wheel, while the other end strikes against the ground.

4. After the apparatus has been mounted properly, the fitting or removal of the tire is completed by revolving the wheel.

5. In fitting the tire a member which is provided with two hooks is caused to slide along the outer edge of the rim by means of the said lever, one end of which engages the end portion of the hub.

6. The member which slides along the rim is provided with a rotatable disk and two rollers; the disk and one of the said rollers engage the tire to be mounted. When the sliding member is moved along the rim by means of the said lever, both beads of the cover are lifted up to the level of the outer edge of the rim when the disk is pressed into the groove or depression above the bead, while one of the rollers is pressed against the bead itself at a point somewhat in advance of the point where the disk engages the cover; by these means the tire is fitted into its proper position and the beads are forced into the corresponding rim grooves.

7. According to the direction of rotation of the wheel either the one or the other roller becomes operative.

8. During no stage of the operation does any part of the apparatus come into con-

tact with the air tube, so that no damage to the latter is to be feared.

In the annexed drawing:

Figure 1 is a perspective view of a tire lever. 60

Fig. 2 is a similar view of the sliding member with the lever.

Figs. 3, 4, 5 and 6 illustrate the manner of fitting the tire on the wheel.

Figs. 7, 8, 9 and 10 illustrate how the tire is removed. 65

In Fig. 1: 1 is the tire lever, having one of its ends tapered; 2 is a hook, 3 is a projection serving as a fulcrum when the tire lever is employed for removing tires whose beads firmly adhere to the rim; 4, 5 and 6 are holes having such a size that the lever 14 can be pressed therethrough. 70

In Fig. 2: 7 is the plate of the sliding member; 8 and 9 are hook-shaped members; 10 is a rotatable disk provided with a hub member; 11 is a coiled spring serving the purpose of keeping the disk 10 at the required distance so that the apparatus may be employed for tires having different sections; 12 and 13 are rollers, 14 is a lever; 15 is an annular member or ring provided at the end of the lever 14. 80

In Fig. 3: 16 is the rim of the wheel; 17 and 18 are the rim grooves; 19 is the end portion of the hub; 20 is the cover; 21 and 22 are the beads; 23 is the air tube; 1 is the tire lever. 85

In Fig. 4 the reference characters 16, 17, 18, 19, 20, 21, 22, 23 designate like parts as in Fig. 3; 7 is the plate of the sliding member; 10 is the rotatable disk; 11 is the coiled spring; 12 is the roller, which is in advance when the sliding member is displaced; 14 is the lever; 15 is the annular member or ring at the end of the lever; 24 is a perspective view of part of the cover. 95

In Fig. 5 which shows the different parts in the positions as illustrated in Fig. 4; 16 is the rim of the wheel; 19 is the end portion of the hub; 20 is the outer tire; 1 is the tire lever; 7 is the plate of the sliding member; 10 is a rotatable disk; 11 is the coiled spring; 12 and 13 are the rollers; 14 is the lever; 15 is the annular member or ring at the end of the lever 14; 25 is an arrow indicating the direction of rotation of the lever 14; 26 is an arrow indicating the direction in which the wheel is to be rotated when the lever 14 rests upon the ground. 100 105 110

or comes in contact with it; 27—28 is a double arrow indicating the length of that part of the tire which in the position illustrated in Fig. 5 has already been forced into the rim.

In Fig. 6 the reference characters indicate like parts as in Fig. 5; 29 is the ground; 30—31 is a double arrow indicating the length of that part of the tire which in the position illustrated in Fig. 6 has already been forced into the rim.

In Figs. 7, 8 and 9 characters 1, 3, 7, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 designate like parts as in the preceding figures.

In Fig. 8: 32 is an arrow showing the direction in which the annular member or ring of the lever must be turned in order that the latter may assume the position illustrated in Fig. 9.

In Fig. 10 the different parts are designated by the same reference characters as in Figs. 6, 7, 8 and 9; 33 is an arrow indicating the direction in which the lever 14 is turned; 34 is an arrow indicating the direction in which the wheel is turned; 35—36 is a double arrow indicating the angular distance through which the tire, owing to the displacement of the lever, has been taken off the rim.

When fitting a tire around a wheel the operation is as follows:

The air tube is slightly inflated and placed into the cover, and then brought into the rim with the air valve in the proper position. Both beads are forced into the respective rim grooves at the top side of the rim, and the outer bead is kept by the tire lever in the corresponding rim groove through a small distance of the rim periphery. (Fig. 3).

The annular member or ring of the lever is then passed around the end portion of the wheel hub and the sliding member is placed so that its two hooks engage the outer rim edge. (Figs. 4 and 5).

The end of the lever is then displaced in the direction of the arrow 25 (Fig. 5), the wheel during this displacement being kept stationary.

Both the apparatus and the wheel are then turned in the direction indicated by the arrow 26 (Fig. 5) until the end of the lever 14 engages the ground (Fig. 6). During this displacement there is no change in the position of the lever 14 relative to the wheel until the former strikes upon the ground. At this moment, however, owing to the momentum of the wheel, the sliding member is displaced and a further portion of the tire brought into its proper position. The wheel is then turned in a direction opposite to that indicated by the arrow 26 and then forcibly turned again in the direction of the arrow, so that the lever strikes a second time upon the ground, and this

process is repeated until the whole tire has been brought into its proper position.

If the wheel is a driving wheel, the operation may be carried out by braking it and by displacing the lever 14, or the wheel may be turned by means of the motor.

When it is desired to remove the tire, the air tube is deflated when the operation is as follows:

If, as is frequently the case, the tire firmly adheres to the rim, the end of the tire lever is passed under the rim as shown in Fig. 7, the projection 3 serving as an abutment.

The lever 14 is then turned with its annular end portion up, when the sliding member, as will be understood, will also be turned.

As shown in Fig. 7 the disk 10 now engages the depression above the bead, and owing to the considerable length of the lever arm it is now an easy matter to force the tire out of the rim groove.

The tapered end of the tool 1 is then passed under the beads and the tire lever is replaced by the lever 14. (Fig. 8).

The lever 14 is then depressed in the direction indicated by the arrow 32 (Fig. 8) and the annular member 15 passed around the end portion of the hub. (Fig. 9).

The wheel is turned in a direction opposite to that indicated by the arrow 34 one or more times, and then forcibly turned in the direction of the said arrow, by which the lever 14 strikes the ground. Owing to the momentum of the wheel the lever is displaced between the rim and the tire and the tire is released. During this movement the annular member or ring 15 of the lever 14 must, as a matter of course, be kept around the hub of the wheel.

In order to prevent the wheel hub from being damaged by the ring 15, the latter may be covered with some soft material such as leather, or a sleeve of such material may be placed around the hub.

To avoid damage to the paint or lacquer on the rim edge by the rubbing action of the lever 14, a removable grooved ring of fiber or some other suitable material may be fitted around the lever just at the level of the rim edge, the said ring being adapted to roll along the rim edge.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In an apparatus for fitting pneumatic tires on vehicle wheels, the combination of a lever having an annular end portion adapted to be passed around the wheel hub, a transversely disposed sliding member on said lever provided with hooks for engaging the rim edge of the wheel, a roller near the end of the sliding member adapted to be pressed against the bead of the tire, and a

disk rotatable about the lever and adapted to be pressed into the depression of the tire above the bead, permitting the mounting of both beads simultaneously on the wheel.

5 2. In an apparatus for fitting pneumatic tires on vehicle wheels, the combination of a lever having an annular end portion adapted to be passed around the wheel hub, a transverse sliding member on said lever
10 provided with hooks for engaging the rim edge of the wheel, a roller near each of the ends of the sliding member adapted to be

pressed against the bead of the tire, and a disk rotatable about and mounted slidably upon the lever and adapted to be pressed 15 into the depression of the cover above the bead, permitting the mounting of both beads simultaneously on the wheel.

In testimony whereof I affix my signature in presence of two witnesses.

JOHAN WESSEL BRAND.

Witnesses:

JULES GERNAECH,
PLANTE FIBURL.