

No. 881,140.

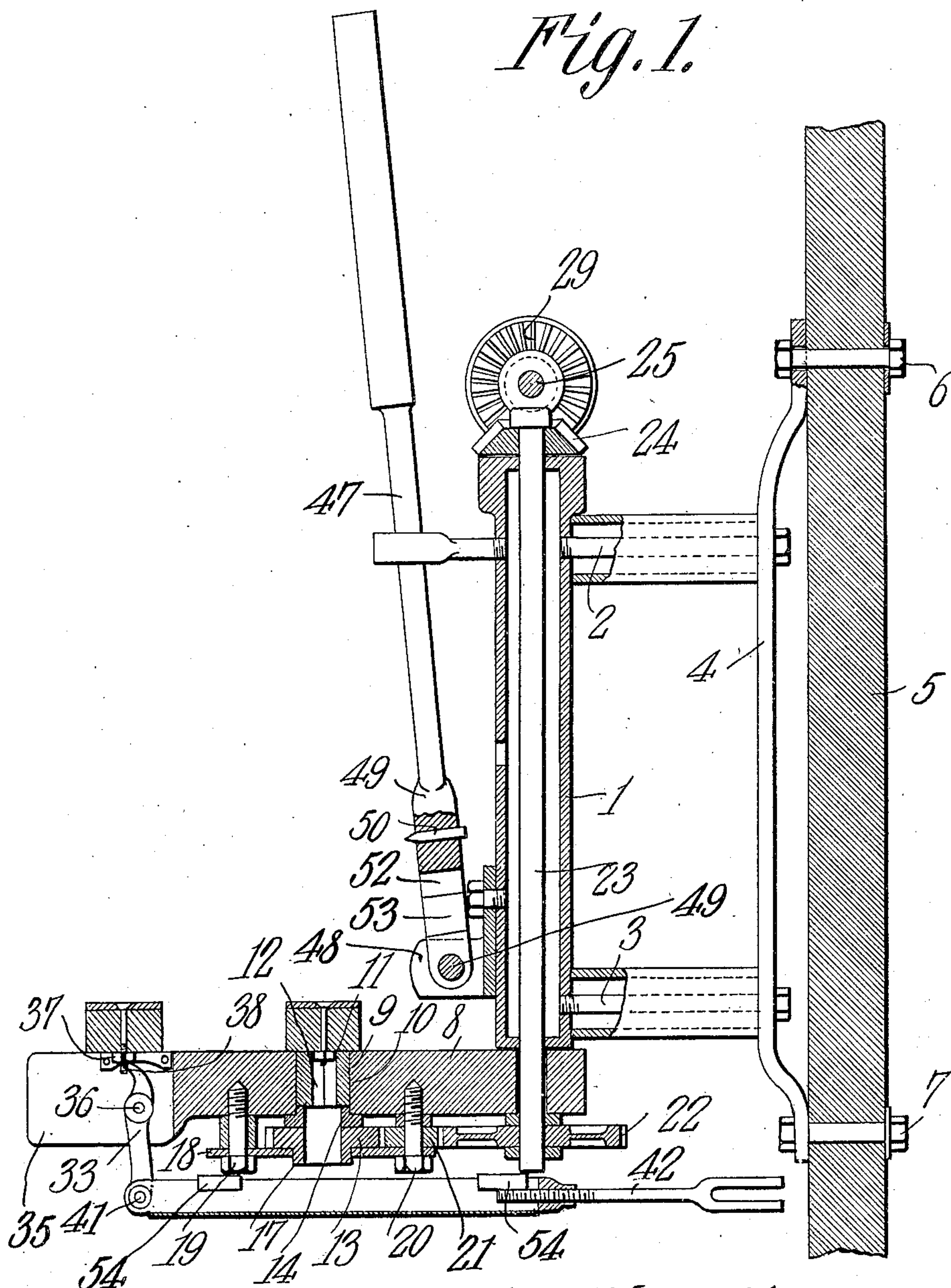
PATENTED MAR. 10, 1908.

B. M. NATION.

BOLT TIGHTENER AND CUTTER FOR WHEELS.

APPLICATION FILED MAY 10, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

E. J. Stewart
C. A. Patience

Brinton M. Nation, INVENTOR.

By *C. A. Snow & Co.*
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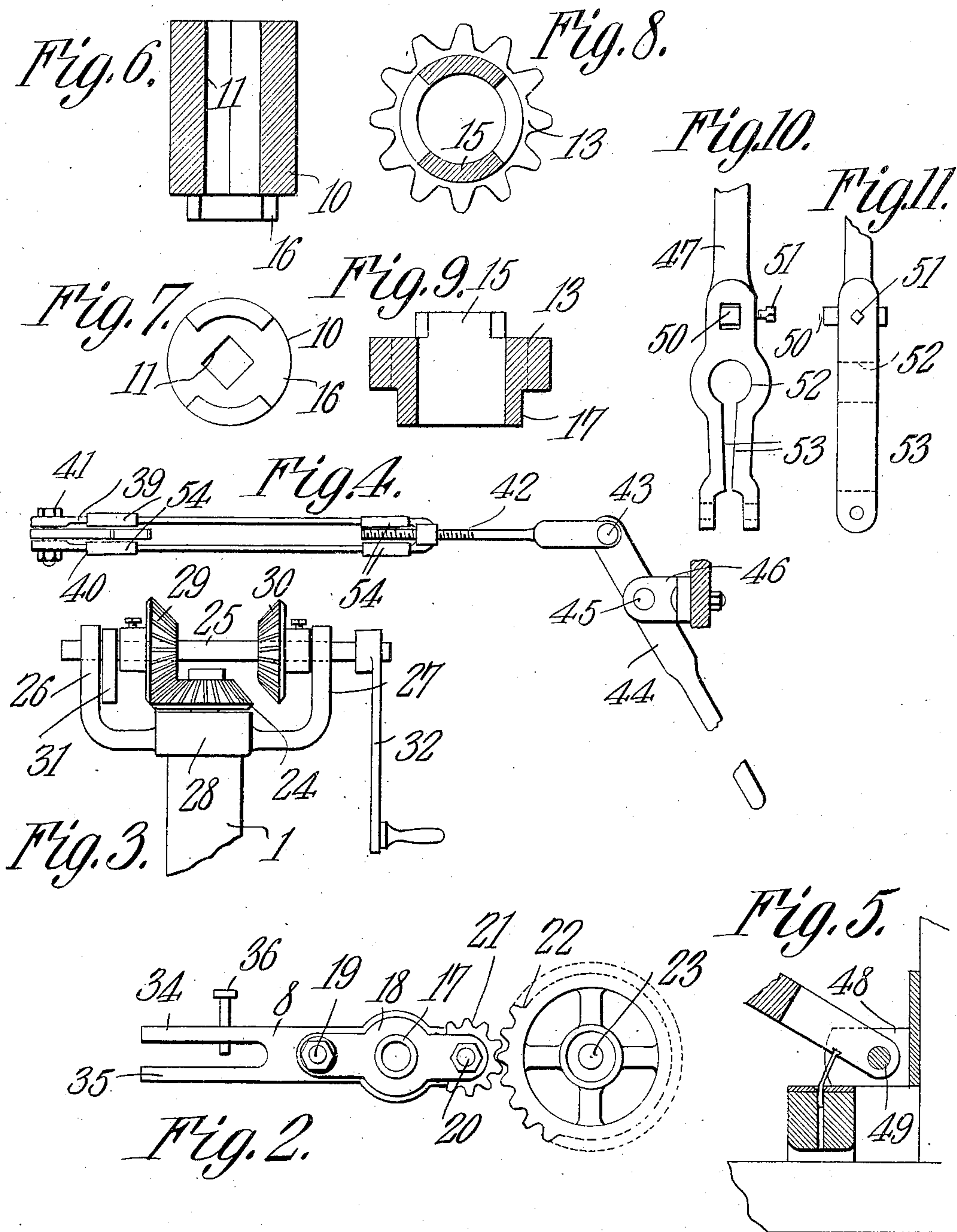
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WITNESSES:

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Brinton M. Nation, INVENTOR.

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UNITED STATES PATENT OFFICE.

BRINTON M. NATION, OF BLOOMFIELD, INDIANA.

BOLT TIGHTENER AND CUTTER FOR WHEELS.

No. 881,140.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed May 10, 1907. Serial No. 372,896.

To all whom it may concern:

Be it known that I, BRINTON M. NATION, a citizen of the United States, residing at Bloomfield, in the county of Greene and State of Indiana, have invented a new and useful Bolt Tightener and Cutter for Wheels, of which the following is a specification.

This invention relates to improvements in tools for applying and removing the bolts employed for securing tires on vehicle wheels, and it has for its object to provide an improved device of this character that is capable of quickly tightening or loosening the nuts of the bolts, an improved cutter being provided for severing the projecting portion of the bolt after the nut has been tightened, and a device being provided for removing the bolt after the nut has been removed, the operations being performed without injuring the bolts or nuts so that they may be used several times.

To these and other ends, the invention comprises the various novel features of construction and combination and arrangement of parts, which will be hereinafter more fully described, and pointed out particularly in the claims appended hereto.

In the accompanying drawings:—Figure 1 is a central vertical section of a tool of the character described constructed in accordance with the present invention. Fig. 2 is a bottom plan view of the device shown in Fig. 1, the cutter being removed. Fig. 3 is a front elevation of the operating mechanism. Fig. 4 is a detail view of the cutter and its operating lever. Fig. 5 is a diagrammatic view showing the mode of removing the bolts from a vehicle wheel. Fig. 6 represents an axial section of the nut wrench. Fig. 7 is a bottom plan view of a nut wrench. Fig. 8 represents a top plan view of the wrench actuating gear. Fig. 9 represents an axial section of the wheel shown in Fig. 8. Figs. 10 and 11 show the extracting lever in bottom plan and side elevation, respectively.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

The device shown in the present embodiment of the invention comprises a hollow standard 1 suitably secured to a post or other support, bolts 2 and 3 carried by a bracket 4 cooperating with the standard in the present instance to secure it in position, the bracket in turn being secured to the post 5 by means of bolts 6 and 7. At the lower end of the

standard, and arranged in fixed relation thereto, is a bed 8 having a vertical bore 9, adapted to form a bearing for a nut wrench 10, the latter, in the present instance, being substantially cylindrical and having an angular socket 11 at its upper end to receive the nuts which serve to retain the tire securing bolts in place, and below the socket the wrench is bored out, as at 12, to form a passage for the nuts after they have been removed from the bolt.

Below the nut wrench and arranged with its axis in alinement therewith is an actuating gear 13 having an upper journal portion 14 extending into the bearing 9 of the bed and having a clutch face formed in the present instance by projections 15 which cooperate with correspondingly formed recesses 16 in the lower end of the wrench, the clutch thus provided serving as a guiding connection between the actuating gear and the wrench and permitting wrenches of different sizes to be interchangeably fitted. The lower journal portion 17 of the gear extends through an aperture forming a bearing in the plate 18, the latter cooperating with the lower side of the gear to support it. This supporting plate is secured to the under side of the bed by means of a pair of bolts 19 and 20, the bolt 20 serving as a journal for an intermediate gear or idler 21, which cooperates with the wrench actuating gear and with a gear 22 fixed to the lower end of the driving shaft 23, the latter being journaled in the standard and carrying a bevel gear 24 at its upper end.

Any suitable means may be employed for operating the driving shaft, it being preferable to employ operating mechanism that is capable of being reversed in order that the wrench may be turned in two directions, that is to say, in a direction to tighten the nuts, and in an opposite direction to loosen or remove the nuts. The operating means shown in the present instance embodies an operating shaft 25 journaled in the arms 26 and 27 of a yoke 28 fixed to the upper end of the standard, a pair of oppositely arranged bevel gears 29 and 30 being fixed to the operating shaft between the arms of the yoke, and the operating shaft being capable of a limited axial movement for shifting the gears 29 and 30 alternately into cooperating relation with the gear 24 on the vertical driving shaft. In order to retain either of the gears on the operating shaft in cooperative relation with

the gear on the driving shaft, it is preferable to employ a suitable retaining device which comprises, in the present instance, a yoke-shaped member 31 which is adapted to fit
 5 over and rest upon the shaft between the gear that is in mesh with the gear 24 and the adjacent arm of the yoke. The operating shaft may be turned in any suitable way, a crank 32 being shown in the present instance
 10 for operating it.

It is advantageous to employ a bolt cutting attachment in connection with a machine of this character whereby those portions of the bolt projecting beyond the nuts,
 15 after the latter have been tightened, may be removed, and the bolt cutter shown in the present instance embodies a lever 33 mounted between the arms 34 and 35 at the outer end of the bed and pivoted to turn on a pin
 20 36, the upper end of the lever being provided with a cutting edge 38 arranged adjacent to the plane of the top of the bed and it coöperates with a shoulder 37 to effect the severing of the bolt end. The lower end of the
 25 lever engages between the arms 39 and 40 of a turn buckle, a bolt 41 serving as a pivotal connection between the cutter and the turn buckle, the opposite end of the latter being threaded to receive the longitudinally adjustable bolt or screw 42 which is pivotally connected at 43 to an operating lever 44, the
 30 latter being fulcrumed at 45 and secured to a relatively fixed support by the bracket 46.

In order to facilitate the extraction of the
 35 bolts from the wheels and to prevent their turning while being tightened or loosened, I provide a lever 47 having one end mounted between the forwardly projecting bearing arms 48, the pin 49 serving as a pivotal connection, and this lever is provided with a
 40 pointed tool or chisel 50 which is secured therein by a set screw 51, or other suitable means, the operating face of this chisel being so located relatively to the pivot of the lever
 45 that it will be arranged in alinement with the axis of the wrench when the lever is turned into operative position, the chisel bearing upon and obtaining a hold on the head of the bolt extending through the wheel tire and
 50 serving to prevent its rotation during the tightening or loosening of the nut.

The lever is also provided with an opening
 52 arranged at a point between the chisel and the pivot of the lever, and extending
 55 from this opening toward the pivot are a pair of relatively fixed convergent jaws 53 adapted to receive the head of the bolt. In the moving of the bolts from the wheel, the nuts are first removed by means of the wrench,
 60 and then the wheel is moved toward the standard so that the head of the bolt is in alinement with the opening 52 of the extracting lever, the threaded end of the bolt resting on top of the bed 8, and as pressure
 65 is applied to the wheel rim through the lever

47, the bolt will be forced outwardly through the rim, exposing the head thereof, and by moving the wheel again toward the standard, the head of the bolt will enter between the
 70 convergent walls of the lever and as the latter is turned upwardly, as shown in Fig. 5, the bolt will be drawn from the wheel rim, the bearing arms 48 coöperating with the rim to prevent its movement during the
 75 extracting operation.

In order to save the nuts after being removed from the bolts, it is preferable to employ a tray, that shown in the present instance being composed of sheet metal and
 80 having its arms 54 folded over the arms 39 and 40 of the turn buckle, the body of the tray resting between the arms of the turn buckle and forming a receptacle for receiving the nuts as they drop through the enlarged opening through the nut wrench and
 85 its actuating gear.

In applying and removing the nuts with a machine constructed in accordance with the present embodiment of my invention, the
 90 wheel rim is supported on the upper face of the bed 8, the nut to be removed being inserted in the angular opening 11 in the wrench, and while the wheel is in this position, the operating shaft 25 is rotated by means of the crank 32, the appropriate bevel
 95 gear thereon being in mesh with the gear 24 on the driving shaft, the gear 22 on the lower end of the lever revolving the idler 21, and the latter in turn coöperating with the wrench actuating gear 13, rotary movement
 100 of the latter being communicated to the wrench through the coöperating clutch faces or projections, the bolt being held from rotation in cases where the nuts are rusted in place by means of the chisel 50, and the nuts
 105 may be tightened by a radial movement of the wrench in a reverse direction, the reverse movement of the wrench being obtained without the necessity of reversing the direction in which the crank is operated by shifting the operating shaft so that the appropriate
 110 gear thereon is in mesh with the gear 24 on the driving shaft.

The bolt cutter, as previously stated, is especially adapted for use in severing those
 115 portions of the bolts projecting beyond the nuts after the latter have been tightened, and the severing operation is performed by inserting the projecting portion of the bolt between the cutting edge 38 of the cutter
 120 and the shoulder 37, the operation of the lever 24 serving to proximate the cutting edge and shoulder.

What is claimed is:—

1. In a machine of the character described, the combination with a suitable bed adapted
 125 to support a wheel rim, of a wrench journaled therein having a socket at its upper end adapted to coöperate with the nut, and having a clutch face on its lower end, an actuat-
 130

ing gear journaled in the bed in alinement with the wrench and having a clutch face on its upper end, and a part removably secured to the under side of the bed for retaining the 5 clutch faces of the wrench and actuating gear in coöperative relation.

2. In a machine of the character described, the combination with a bed adapted to support a wheel rim, of a wrench journaled in 10 the bed, an actuating gear arranged in axial alinement with the wrench having an upper journal portion, the latter and the lower end of the wrench being provided with coöperating segmental projections and correspond- 15 ingly shaped recesses forming a driving connection between these parts, and a supporting plate removably secured to the under- side of the bed and coöperating with the actuating gear to maintain the driving con- 20 nection between the latter and the wrench.

3. In a machine of the character described, the combination with a bed having an aperture extending therethrough and forming a bearing, of a wrench having a journal por- 25 tion engaging in the said bearing and extending partially through the bed, the lower end of the wrench being provided with segmental recesses, a driving gear having an upper journal portion extending into the said 30 bearing on the under side of the bed, the upper edge of the upper journal portion being provided with a segmental projection coöperating with the correspondingly shaped recess in the wrench, a journal portion 35 formed on the gear below the journal portion first mentioned, and a supporting plate detachably mounted on the under side of the bed and having a bearing coöperating with the journal portion at the lower end of the 40 said gear for retaining the latter in coöperative relation with the wrench.

4. In a machine of the character described, the combination with a suitable bed, and a wrench journaled therein, a driving mechan- 45 ism for the wrench including a driving shaft, a bevel gear mounted thereon, a pair of oppositely arranged bevel gears arranged to co-operate alternately with the bevel gear on the driving shaft, an operating shaft sup-

porting said pair of gears, bearings arranged 50 at the outer sides of the gears last mentioned and supporting the shaft, and a device adapted to removably fit over the operating shaft between one of the gears and its cor- 55 responding bearing to retain the said gear in coöperative relation with the gear on the driving shaft.

5. In a machine of the class described, the combination with a bed, of a wrench jour- 60 naled therein, and gearing for revolving the wrench, of a standard, a driving shaft mount- ed axially thereon and having a gear at its lower end coöperating with the gearing on the bed and having a bevel gear at its upper 65 end, a yoke on the upper end of the standard provided with a pair of bearing arms, an operating shaft journaled therein and capa- ble of axial movement, a pair of reversely arranged bevel gears mounted in fixed re- 70 lation on the shaft and movable into and out of coöperative relation with the bevel gear on the driving shaft, and a yoke-shaped mem- ber adapted to fit between one of the gears and its respective bearing arm to prevent 75 axial movement of the operating shaft.

6. In a machine of the character described, the combination with a suitable bed, of a wrench journaled thereon, an actuating gear 80 mounted in axial alinement with said wrench and having a detachable driving connection therewith, a supporting plate removably ap- plied to the underside of the bed and co- operating with the gear to retain it in co- operative relation with the wrench, bolts for 85 securing said plate in position, one of the bolts forming a journal, an intermediate gear mounted on the said bolt as a journal and coöperating with the wrench actuating gear, and an operating gear coöperating with 90 the intermediate gear.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

BRINTON M. NATION.

Witnesses:

JAMES W. DALRYMPLE,
CORENA M. BARNES.