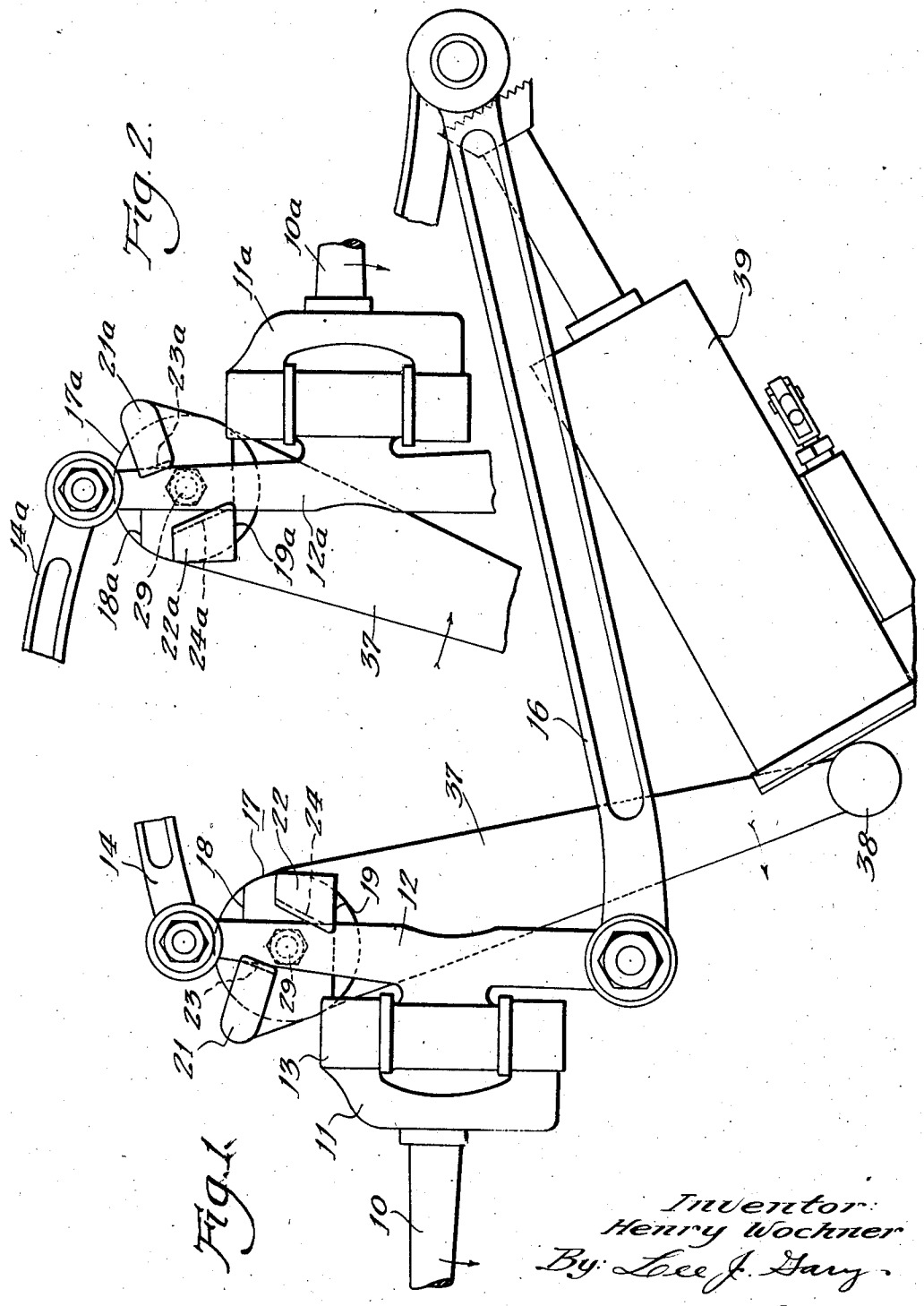
Nov. 18, 1947. H. WOCHNER 2,431,291

CAMBER CORRECTION TOOL

Filed Dec. 16, 1944 3 Sheets-Sheet 1



Inventor:
Henry Wochner
By: Lee J. Gary.
Attorney

Nov. 18, 1947. H. WOCHNER 2,431,291

CAMBER CORRECTION TOOL

Filed Dec. 16, 1944 3 Sheets-Sheet 2

Fig. 4.

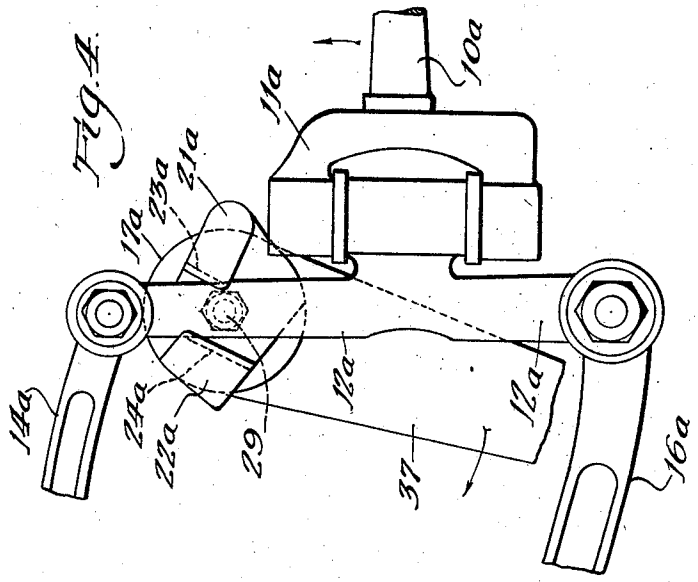
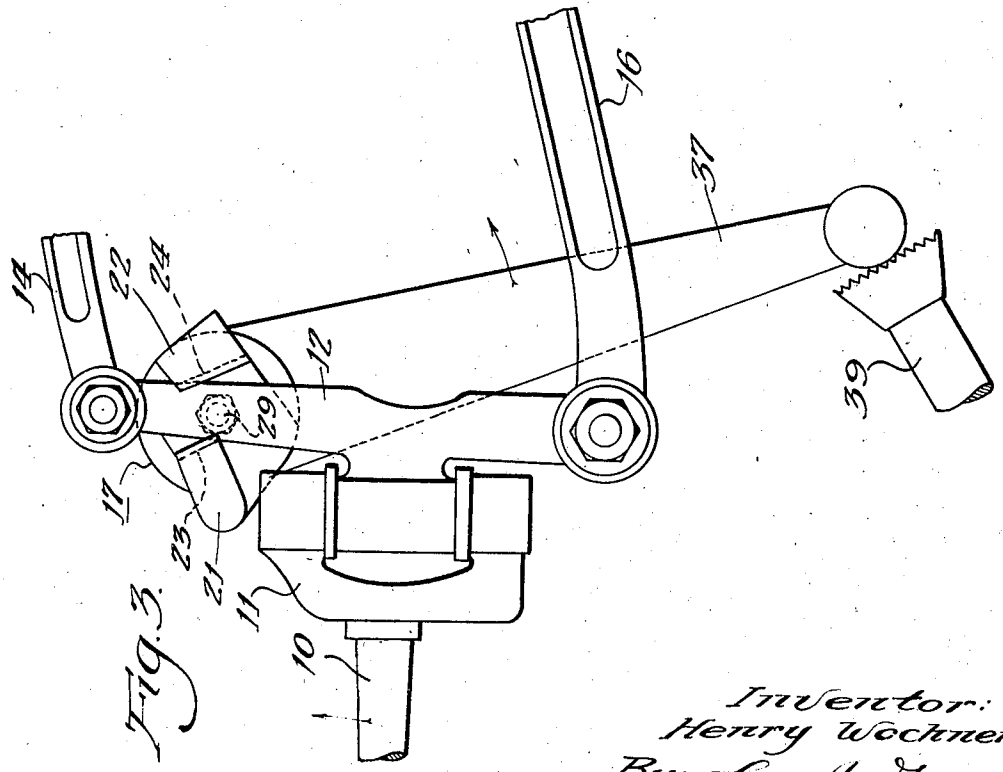


Fig. 3.



Inventor:
Henry Wochner
By: Lee J. Gary.
Attorney.

Nov. 18, 1947. H. WOCHNER 2,431,291

CAMBER CORRECTION TOOL

Filed Dec. 16, 1944 3 Sheets-Sheet 3

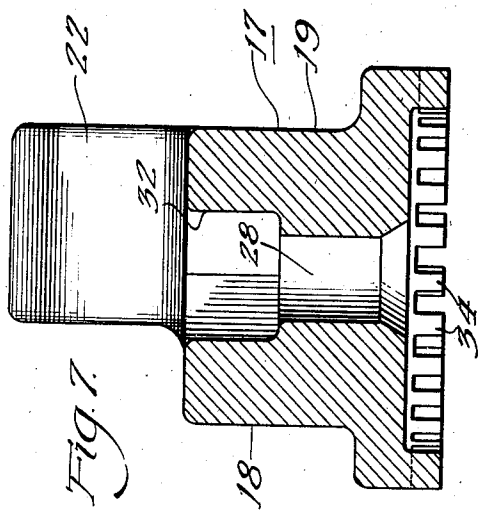


Fig. 7.

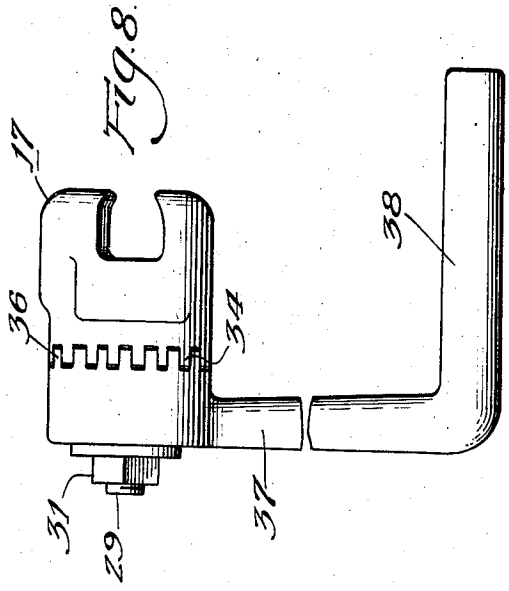


Fig. 8.

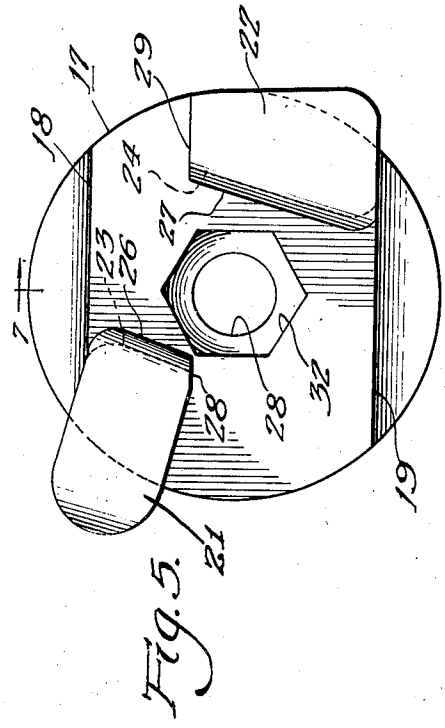


Fig. 5.

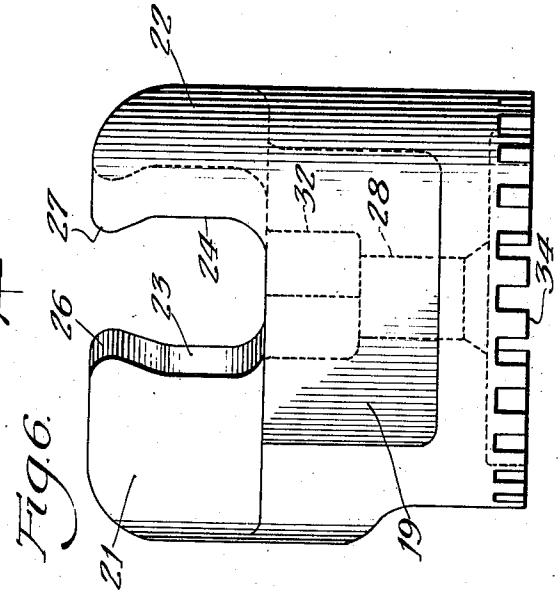


Fig. 6.

Inventor:
Henry Wochner
By: Lee J. Gary
Attorney

Patented Nov. 18, 1947

2,431,291

UNITED STATES PATENT OFFICE

2,431,291

CAMBER CORRECTION TOOL

Henry Wochner, Rock Island, Ill., assignor to Bear Manufacturing Company, Rock Island, Ill., a corporation of Delaware

Application December 16, 1944, Serial No. 568,529

2 Claims. (Cl. 153—32)

1

This invention relates to bending tools and is more particularly concerned with a tool of this type adapted for use in bending the steering knuckle supporting arm of the type now commonly provided in knee action front wheel assemblies of automobiles, for the purpose of correcting the camber of a wheel associated therewith.

More particularly this invention contemplates the provision of a camber correction tool adapted for use in bending steering knuckle supporting arms for the purpose of either increasing or decreasing the camber of a wheel, depending upon the direction in which force is applied to the end of the bending tool.

A further object of this invention is to provide a bending tool of this type adapted for use with various makes of automobiles for correcting the camber of the front wheels thereof.

It is a further object of this invention to provide a tool of this type in which a head is provided with a pair of opposing work engaging jaws formed with parallel opposing work engaging faces arranged in offset relation, and in which a lever arm is detachably connected to the inner end of the head for radial adjustment about the longitudinal axis of same. The bending tool preferably comprises a pair of interchangeable work engaging heads, one which is adapted for use in correcting the camber of the right front wheel while the other head is adapted for use in correcting the camber of the left front wheel.

This invention embodies other novel features, details of construction and arrangement of parts which are hereinafter set forth in the specification and claims, and illustrated in the accompanying drawings wherein:

Fig. 1 is a front elevational view showing a camber correction tool embodying features of this invention as applied to the steering knuckle supporting arm of the right front wheel of an automobile for increasing the camber thereof.

Fig. 2 is a front elevational view showing the camber correction tool equipped with the left hand work engaging head and applied to the steering knuckle supporting arm of the left front wheel of an automobile for increasing the camber thereof.

Fig. 3 is a front elevational view showing the bending tool engaging the steering knuckle supporting arm of the front right wheel of an automobile for decreasing the camber thereof.

Fig. 4 is a front elevational view showing the bending tool engaging the steering knuckle supporting arm of the left front wheel for decreasing the camber thereof.

2

Fig. 5 is a detail front elevational view showing the right hand work engaging head employed in correcting the camber of the right front wheel of an automobile.

Fig. 6 is a side elevational view of the same.

Fig. 7 is a sectional view of same taken along the line 7—7 of Fig. 5.

Fig. 8 is a side elevational view of the assembled bending tool showing the means employed for detachably connecting either the right or left hand work engaging head in rotatively adjusted position on the lever arm.

Referring now to the drawings for a better understanding of this invention, Figs. 1 to 4 show a typical form of knee action wheel mounting for automobiles in which the steering knuckle 11 is pivotally connected to a supporting arm 12 by means of a king pin 13. The ends of the steering knuckle supporting arm 12 are pivotally connected to the outer ends of a pair of connecting links 14 and 16 which, in turn, are pivotally connected at their inner ends to the chassis or other portion of an automobile. It is known by those skilled in this art that the camber of wheels may readily be corrected by slightly bending the upper portion of the steering knuckle supporting arm 12 in the proper direction. For increasing the camber of a wheel the steering knuckle supporting arm 12 is bent outwardly, as illustrated in Figs. 1 and 2; and for decreasing the camber of wheels the steering knuckle supporting arm 12 is bent inwardly, as illustrated in Figs. 3 and 4. While the type of knee action suspension for front wheels of automobiles shown in the drawings is typical for the various makes of automobiles, the size and arrangement of the several parts are somewhat varied and usually require the use of special tools particularly designed for use with predetermined automobile designs. The bending tool shown and hereinafter described is adapted for use in correcting the camber on most, if not all, of the several makes of cars.

Referring now more particularly to Figs. 1, 3 and 5 to 8 in the drawings, the camber correcting tool for use with the right front wheel of an automobile is shown as comprising a right hand head 17 formed with flattened side walls 18 and 19 and outwardly projecting work engaging jaws 21 and 22. The jaws 21 and 22 are formed with work engaging faces 23 and 24, respectively, arranged in opposing and offset parallel alignment on opposite sides of the longitudinal axis of the head. At the outer ends of the work engaging

faces 23 and 24, the jaws are formed with overhanging lip portions 26 and 27, respectively.

Referring now more particularly to Fig. 5, it will be noted that the jaw 21 projects outwardly from the face of the head 17 adjacent the flattened side wall 18 thereof, while the jaw 22 projects outwardly from the face of the head adjacent the flattened side 19 thereof. It will further be noted that the inner corners 28 and 29 of the legs 21 and 22, respectively, are disposed in parallel alignment with the flattened sides 18 and 19 and are equidistantly spaced from either the side 18 or side 19. It will further be noted, by referring to Fig. 5, that the work engaging face 23 provided on the jaw 21 is of relatively small width as compared with the work engaging face 24 on the jaw 22.

The head 17 is provided with a centrally disposed longitudinally extending aperture 28 to receive a bolt 29 which is threaded to receive a nut 31. The outer end of the aperture 28 is formed hexagonal at 32 to snugly receive the head portion 33 of the bolt. The inner end of the head 17 is formed with a plurality of teeth 34 for interlocking engagement with a plurality of teeth 36 formed on a lever arm 37 which is detachably connected to the inner end of the head and radially adjustable with respect thereto by means of the bolt 29. The outer end of the lever arm 37 is offset at 38 in parallel alignment with the longitudinal axis of the head 17 to extend beyond the outer ends of the work engaging jaws 21 and 22.

In the operation of the bending tool thus described for increasing the camber of the right front wheel of an automobile, the tool is mounted in engagement with the upper portion of the steering knuckle supporting arm 12, as illustrated in Fig. 1 in the drawings, and pressure is preferably applied to the offset portion 38 of the lever arm 37 by means of a manually operable hydraulic jack 39, causing the work engaging jaw 22 to bend the engaged upper portion of the supporting arm 12 outwardly. By thus bending the supporting arm 12, the wheel spindle 10 is moved downwardly, as indicated by the arrow, to increase the camber of the wheel.

To decrease the camber of the right front wheel of an automobile, the bending tool is mounted on the supporting arm 12 in the manner illustrated in Fig. 3 of the drawings and force is exerted against the outer end of the lever arm 37, causing the jaw 21 to act against the supporting arm 12 and bend the engaged portion inwardly to raise the spindle 10 and thus decrease the camber of the wheel.

Due to the relatively long bending leverage provided for bending the upper portion of the supporting arm 12, it has been found that very accurate camber adjustments may be provided for the wheels and with little effort on the part of the operator. Due to the particular construction and arrangement of the jaw members 21 and 22, the tool is suitable for use with many, if not all, of the various sizes and forms of steering knuckle supporting arms now provided on knee action wheel mountings of automobiles.

Figs. 2 and 4 show the use of an interchangeable work engaging head 17*a* which is employed for correcting the camber of the left front wheel of an automobile. It will be noted that the head 17*a* is provided with work engaging lugs 21*a* and 22*a* which are similar in form to the jaws 21 and 22 provided on the head 17 heretofore described. However, it will be noted that the positions of the jaws 21*a* and 22*a* on the head 17*a* are reversed from the positions of the jaws 21 and 22 on the head 17. In other words the jaws 21 and 21*a* are always arranged to engage the outer side of their respective supporting arms 12 and 12*a* while the jaws 22 and 22*a* are disposed to engage the inner sides of their respective supporting arms. The work engaging head 17*a* is otherwise similar in construction and operation to the head 17 heretofore shown and described in connection with Figs. 1, 3, and 5 to 8 in the drawings and similar numbers followed by the letter "*a*" are provided to indicated corresponding parts.

In Fig. 2 the bending tool is shown in position for engaging and outwardly bending the upper end of the supporting arm 12*a* for increasing the camber of the left front wheel of an automobile, while in Fig. 4 the bending tool is arranged for inwardly bending the engaged portion of the upper end of the supporting arm 12*a* for decreasing the camber of the left front wheel.

It will be noted that a tool of the type thus shown and described is relatively inexpensive in construction, may readily be applied for use in correcting the camber of automobile wheels for either increasing or decreasing the camber of same, and is adapted for use with either the right or left hand steering knuckle supporting arm by merely interchanging the work engaging heads 17 and 17*a*. In the use of a tool of this type it has been found to be essential to provide a relatively long leverage for accurately correcting the camber of wheels as a relatively short leverage tool has a tendency to bend the supporting arm beyond the point of correct camber. Another reason the tool is provided with a relatively long leverage for correcting camber is to have it long enough to clear the steering rods, knee action supports and to make it possible to bend the steering knuckle with a small jack. It will further be noted that the provision of an offset portion 38 on the arm 37 permits an application of force to the bending tool in alignment with the work engaging jaws to insure proper bending of the steering knuckle supporting arm.

While this invention has been shown in but one form, it is obvious to those skilled in the art that it is not so limited but is susceptible of various changes and modifications without departing from the spirit and scope of the claimed invention.

I claim as my invention:

1. In a camber correction tool for bending a steering knuckle supporting arm to increase or decrease the camber thereof, a head provided on said tool, a pair of work engaging jaws projecting outwardly from the face of said head on opposite sides of the longitudinal axis of said head, one of said jaws having a relatively wide flat face and the other jaw having a relatively narrow flat face, said jaw faces facing toward each other in overlapping offset relation, and said jaws being spaced apart a greater distance than the width of the steering knuckle supporting arm upon which the tool is designed to operate, and being so located that lines from said axis to the centers of the jaw faces make angles with the nearest portions of said faces of less than 90°, the inner adjacent corners of said jaws being disposed to engage opposite sides of a steering knuckle supporting arm for decreasing the camber of the arm, the outer corners of said jaws being disposed to engage opposite sides of a steering knuckle

supporting arm for increasing the camber of the arm.

2. In a camber correction tool for bending a steering knuckle supporting arm to increase or decrease the camber thereof, a head provided on said tool, a pair of work engaging jaws projecting outwardly from the face of said head on opposite sides of the longitudinal axis of said head, one of said jaws having a relatively wide flat face and the other jaw having a relatively narrow flat face, said jaw faces facing toward each other in overlapping offset relation, and said jaws being spaced apart a greater distance than the width of the steering knuckle supporting arm upon which the tool is designed to operate, and being so located that lines from said axis to the centers of the jaw faces make angles with the nearest portions of said faces of less than 90°, the inner adjacent corners of said jaws being disposed to engage opposite sides of a steering knuckle supporting arm for decreasing the camber of the arm, the outer corners of said jaws being disposed to engage opposite sides of a steering knuckle supporting arm for increasing the camber of the arm, and a lever arm detachably connected to the inner side of said head for adjustably positioning the lever arm radially about the longitudinal axis of the head.

HENRY WOCHNER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
738,065	Pugh	Sept. 1, 1903
1,076,793	Seipel	Oct. 28, 1913
1,514,025	Stensrud	Nov. 4, 1924
2,263,628	Hinton	Nov. 25, 1941
2,365,731	Simons	Dec. 26, 1944

OTHER REFERENCES

Pub. by Bear Mfg. Co. describing "Bear Camber Corrector #1932," Dec. 1943.