Feb. 6, 1951 C. E. JACKSON 2,540,370

WHEEL HOLDING CHUCK FOR WHEEL STRAIGHTENING MACHINES

Filed Sept. 13, 1948 2 Sheets-Sheet 1

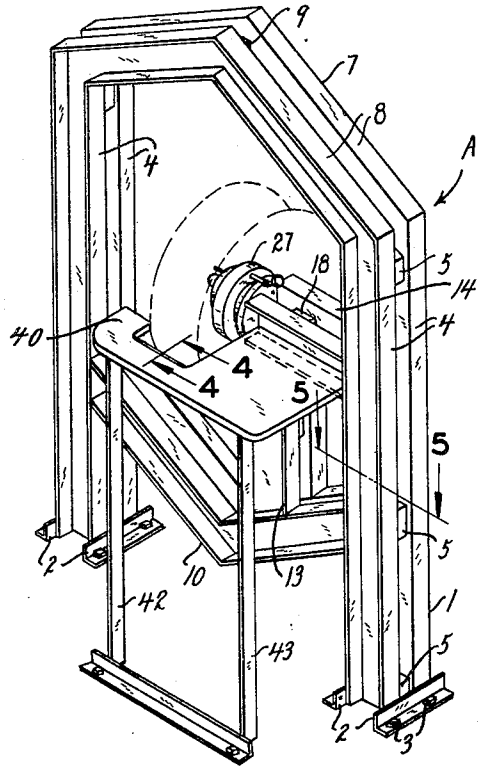

FIG. 1

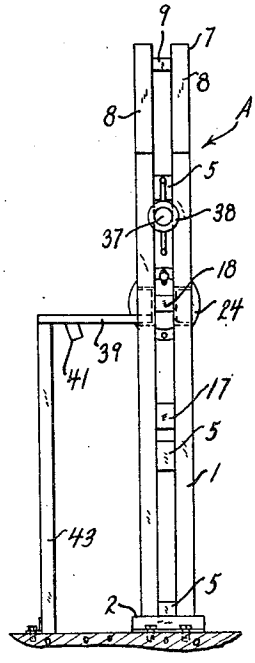

FIG. 2

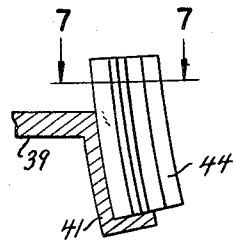

FIG. 4

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WHEEL HOLDING CHUCK FOR WHEEL STRAIGHTENING MACHINES

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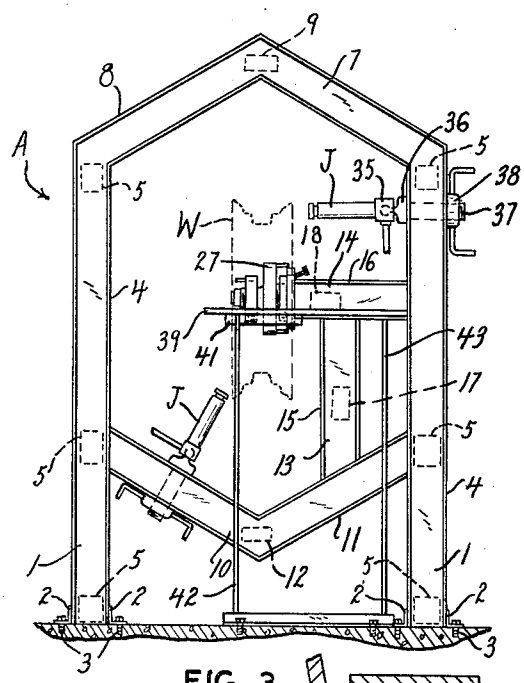

FIG. 3

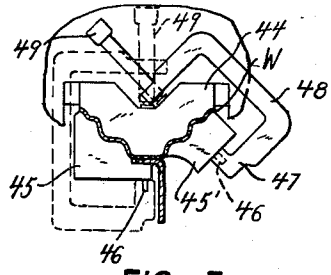

FIG. 7

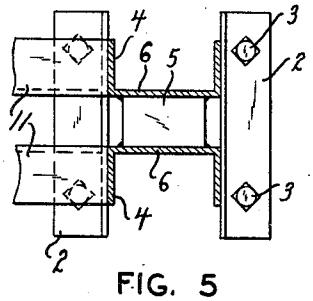

FIG. 5

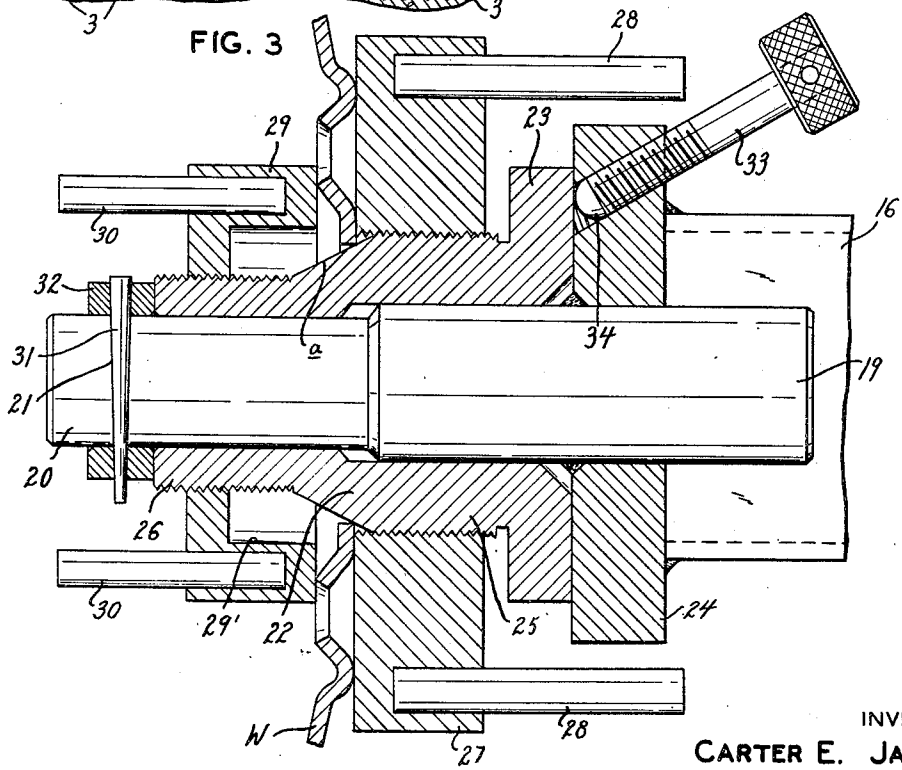

FIG. 6

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WHEEL HOLDING CHUCK FOR WHEEL-STRAIGHTENING MACHINES

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Application September 13, 1948, Serial No. 49,066

1 Claim. (Cl. 144—288)

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This invention relates in general to certain new and useful improvements in wheel straightening machines.

At the present time, automobile repair shops are frequently called upon therewith to straighten vehicle wheels which have been bent, distorted, or otherwise twisted "out of true" by various types of accidents. In such work it is necessary to supply various types of force at varying angles to the rims and internal areas of the wheel to bend, twist or press them back into precise true run circularity. And obviously such force must be applied to the inside of the rim as well as to the outside of the rim. In fact, it is just as necessary to straighten the wheel under certain circumstances as it is to bend it. Actual experience has shown that the manipulations to which a wheel must be subjected during the straightening process are almost infinite in variety. At the present time the wheel straightening machines which are in use are constructed more or less like flat top tables and do not permit a ready access to all the parts of the wheel.

Furthermore, present day type of machines require the use of different chucks or collars to mount each different make of vehicle wheel with the result that a garage mechanic must keep in stock a very large number of different kinds of adaptors and other devices so that any and all types of vehicle wheels can be mounted in the machine. Because of the difficulty and inefficiency attendant upon use of present day wheel straightening machines, an excessive amount of time is required to perform even the simplest type of wheel straightening job with the result that the repair shop must either charge the customer a price which seems exorbitant with respect to the value of the article being repaired or must charge a lower price and suffer loss on the work.

For this reason, as well as for the reason that work is done on present day wheel straightening machine is not too accurate, many repair shops refuse to straighten wheels and instead require the customer to purchase brand new wheels or take the work elsewhere.

It is, therefore, the primary object of the present invention to provide a new and novel type of wheel straightening machine which is simple in construction and operation and is highly universal in its adaptability to the multiplicity of wheel straightening operations which ordinarily are required to be performed in the daily course of wheel repairing operations.

It is a further object of the present invention

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to provide a wheel straightening machine mounted upon a horizontal axis and which is accessible from top, bottom, and both sides so that the wheel can be quickly and accurately straightened with a minimum of time and labor.

It is a further object of the present invention to provide a substantially universal chuck capable of receiving and supporting a wide variety of different types and sizes of vehicle wheels.

It is also an object of the present invention to provide a wheel straightening machine in which the wheel is rotatably mounted within an encircling framework adapted to support hydraulic jacks and other straightening tools at any desired angle or any desired position, as circumstances may require.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claim.

In the accompanying drawings (two sheets)—

Figure 1 is a perspective view of a wheel straightening machine constructed in accordance with and embodying the present invention;

Figures 2 and 3 are side and front elevational views, respectively, of the wheel straightening machine;

Figures 4, 5, and 6 are fragmentary horizontal sectional views taken along lines 4—4, 5—5, and 6—6, respectively, of Figure 1, and

Figure 7 is a fragmentary vertical sectional view taken along line 7—7 of Figure 4.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of my present invention, A designates a wheel straightening machine comprising two spaced parallel vertical posts 1 each fastened rigidly to the floor or on the supporting structure by means of foot flanges 2 and lag bolts 3. The posts 1 are fabricated from two U-shaped channel sections 4 disposed in back-to-back relation and welded to spacer blocks 5, whereby the webs 6 are held in spaced parallel relation.

At their upper ends, the post members 1 are transversely connected by an upper bridging member 7 having an inverted V-shape, and formed of U-shaped channel members 8 matching the channel members 4 and welded thereto, and held in spaced parallel relation at the apex by means of a spacer block 9, similarly held to the posts 1, and extending transversely therebetween at points spaced upwardly from the lower ends thereof, is a second or bottom bridg-

ing member 10, substantially identical in every respect to the first or upper bridging member 7, being formed of U-shaped channel members 11 held in spaced parallel relation by a spacer block 12.

It should be noted in this connection that the second or lower bridging member 10 is reversed with respect to the upper bridging member 7 so as to provide a substantially symmetrical six-sided framework within which, wheel straightening operations can be performed.

Welded at its lower end to the upper faces of the pair of channels 11, and extending upwardly therefrom, in spaced parallel relation to the posts 1, is a vertical leg 13 which is, in turn, welded at its upper end to a short horizontal support 14, the latter being welded at its outer end to the posts 1. The leg 13 and support member 14 are also formed of two sections of U-shaped channels 15, 16, respectively, welded to and held in spaced parallel relation by, spacer blocks 17, 18.

Welded to, and projecting horizontally from, the overhanging end of the support member 14, is a short spindle 19 provided at its outer end with a diametrically reduced portion 20 which is, in turn, provided, adjacent the outer end, with a diametrical drill hole or bore 21. Rotatably journaled upon the spindle 19, and internally counter-bored to fit snugly upon both diameters thereof, is a chuck sleeve 22 integrally including a relatively large interior circular flange 23 adapted to bear arcuately against the outwardly presented face of a matching flange 24 welded upon the outer overhanging end of the support member 14.

Outwardly of the flange 23, the chuck sleeve 22 is provided with an externally threaded intermediate barrel portion 25 which, at its outer margin, tapers inwardly in the provision of a small conical section *a* which terminates at its outer or smaller end in an externally threaded tail portion 26. Threadedly mounted upon the intermediate barrel portion 25 is a back collar 27 provided upon its rear face with two diametrally juxtaposed rearwardly projecting handle pins 28 to facilitate tightening the collar 27 in place by hand or by the use of conventional tightening tools. Similarly threaded upon the tail portion 26 is a clamping collar 29 similarly provided upon its forward face with two diametrally juxtaposed forwardly projecting handle pins 30 to facilitate tightening the collar 29 in place by hand or by the use of conventional tightening tools. For convenience, the clamping collar 29 is of substantially smaller diametrical size than the back collar 27. It should also be noted that the collar 29 is internally counterbored, as at 29', to clear the conical section *a* of the chuck sleeve 22.

Removably held upon the outer portion 20 of the spindle 19 by means of a taper pin 31 is a retention collar 32 which bears endwise against the chuck sleeve 22 to hold the latter upon the spindle 19. It may be noted in this connection that the aperture 21 is so located in reference to the flange 24 and the length of the chuck sleeve 22 so that the latter will be held snugly against the flange 24 and still be free to rotate upon the spindle 19. Threadedly mounted in and extending obliquely through the flange 24 is a holding screw 33 which is provided at its forward end with a rounded pipe portion 34 adapted to bear against the inner face of the flange 23. By turning the holding screw forwardly the pipe portion 34 can be brought to bear against the inner face of the chuck flange 23 with greater or lesser degrees of friction as may be desired so that the chuck sleeve 22 can be held in substantially stationary or immovable position upon the spindle 19 or can be permitted to rotate upon the spindle 19 with any desired degree of freedom.

Provided for co-operation with the wheel straightening machine are a plurality of hydraulic rams or jacks J provided at their lower ends with a conventional ball socket base 35 for lockable engagement with a projecting ball end 36 of a mounting screw 37 which extends to fit slidably between the webs 6 of the channels 4 and is provided upon its outer projecting end with a clamping nut 38. By loosening the clamping nut 38, jacks J can be moved upwardly or downwardly and locked in any selected position around the framework of the wheel straightening machine.

Bolted, welded, or otherwise rigidly secured along its rearward margin to the under flange of the channel 15 of the support member 14 is a forwardly extending horizontal table 39 having a width in the forward direction substantially greater than the radius of the largest wheel to be accommodated on the spindle 19 and extending transversely across the machine A to a point just short of the matching flange 24. Along its outer transverse margin, the table 39 is integrally provided with a narrow lateral extension portion 40 which projects transversely a substantial distance beyond the outermost peripheral limits of the widest wheel adapted to be mounted on the spindle 19. In outwardly disposed more or less peripheral alignment with the rim face of a wheel mounted on the spindle 19, as shown schematically in dotted lines in Figures 1 and 3, the extension portion 40 of the table 39 is provided with a depending arcuate recess or rim-die holding fixture 41, all as best seen in Figures 1 and 4, and for purposes presently more fully appearing.

The table 39 is finally provided, in any conventional manner, along its outer horizontal margin with two depending legs 42, 43, adapted to reach down and rest upon the floor or other supporting structure and thereby hold the table 39 firmly and immovably in horizontal position.

In use and operation, the back collar 27 is threaded rearwardly toward the flange 23 and the clamping collar 29 is entirely removed from the chuck sleeve 22. The wheel which is to be straightened is slid over the tail portion 26 and centered upon the conical portion *a* of the chuck sleeve 22, whereupon, the back collar 27 is threaded up again until it bears snugly against the back face of the wheel W. Care must be observed not to displace the centering engagement between the conical portion *a* of the chuck sleeve 22 and the wheel W. Thereupon, the clamping collar is threaded onto the tail portion 26 until it bears tightly against the forwardly presented face of the wheel W. Finally, while the back collar 27 is held stationary by suitable spanner wrenches, the clamping collar 29 is turned tightly down so that the wheel will be held firmly and securely in centered position upon the chuck sleeve 22.

When the wheel is thus mounted in the wheel straightening machine, it may be spun or rotated so that the various imperfections "out-of-true" portions will be revealed to the mechanic, and the jacks J may be appropriately positioned around the framework so that straightening

pressure can be imposed upon those portions which must be bent or deflected to restore the wheel to its proper condition of singularity and balance.

Because present-day wheels are manufactured in a variety of unique cross sectional shapes, it has been found desirable to provide, in connection with the present wheel straightening machine A, a plurality of sets of die blocks such as those shown in Figures 4 and 7. Each set of die blocks comprises a female block **44** contoured to fit the inside rim portion of the wheel W and conform lengthwise to a short arcuate segment of the periphery thereof. Also provided are two complementary shaped male blocks **45**, **45'**, adapted to conform to the external portion of the rim along the same arcuate segment. On their faces, the blocks **45**, **45'**, are provided with projecting pins **46** for loose-fitting disposition within the stationary jaw portion **47** of a conventional C-clamp fitting **48**, adapted to be operably mounted on the end of a hydraulic ram or jack **49**. The C-clamp is of such size as to fit around the wheel, and both the female block **44** and the male block **45** or **45'**, whichever is being used in the manner shown alternatively in full and dotted lines in Figure 7. A set of such die blocks will be provided for each standard or different type of automobile rim and may be used to press out any dents or deformations which may occur to the wheel during use, returning the rim to its original shape. In using the die blocks to re-form a distorted rim, the selected female block **44** which fits the particular make of wheel being straightened is placed on end in the fixture **41** of the table **39** substantially in the manner shown in Figure 4, in which position it is in more or less disengaged alignment with the rim. The C-clamp fitting **48** and its associated hydraulic jack **49** are placed upon the table **39** in loose-fitting disposition around the wheel rim and female block **44**. Either one or both of the matching male blocks **45**, **45'**, are then manually held in place on the inside face of the rim substantially as shown in Figure 7, and the hydraulic jack **49** energized to squeeze the die blocks together imposing re-forming pressure upon the engaged portions of the wheel rim. After this application of pressure for a length of time, and to a degree, which seem to the mechanic suitable for the particular type of deformation being dealt with, the pressure within the hydraulic jack **49** is released and the male die blocks **45**, **45'**, are manually placed back upon the table **39** momentarily. The female block **44** falls back to rest in its fixture **41** and the wheel W is almost instantaneously disengaged so that it may be manually spun or turned upon the spindle **19** to determine whether or not the re-formation has been sufficient to bring the wheel W back into true alignment and concentricity. In most cases it will be necessary to repeat this series of rim re-forming operations several times, either at the same place or at other different places around the periphery of the rim, in order to effect a complete and satisfactory re-shaping of the rim structure.

Inasmuch as the female block member **44** must necessarily be comparatively heavy and cumbersome, the rim re-forming operations in the wheel straightening machine A of the present invention are much more accurate, convenient, and speedy, and are less tiring upon the mechanic than comparable wheel straightening operations which have been heretofore performed. Since the table **39** supports the weight of the jack **49** and the female block **44**, and holds them in a convenient and accessible position to the work at all times during the rim re-forming operations, it is possible to release and re-apply rim re-forming pressure at various places around the periphery of the wheel without an undue amount of back-breaking effort or lost set-up time, and the accuracy with which this type of operation can be performed is greatly increased over methods heretofore available. If necessary, the entire rim can be pressed back into shape, if it has been distorted, by working around the entire rear periphery thereof in successive sections.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the wheel straightening machine may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

In a wheel mounting machine, a spindle, a sleeve rotatably mounted on said spindle, said sleeve being provided at one end with a relatively enlarged externally threaded portion and at its other end with a relatively small externally threaded portion and being provided with a uniformly tapered portion intermediate said externally threaded portions for concentrically receiving the hub openings of wheels of various sizes, a relatively large collar threadedly mounted upon the enlarged portion of the sleeve and having an outwardly presented face truly perpendicular to the axis of the spindle for abutment against the wheel, and a clamping collar threadedly mounted upon the smaller externally threaded end portion for forcing the wheel back against the first named collar and clamping it in such position.

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