

March 11, 1930.

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APPARATUS FOR MAKING WHEEL SPIDERS

Filed May 7, 1928

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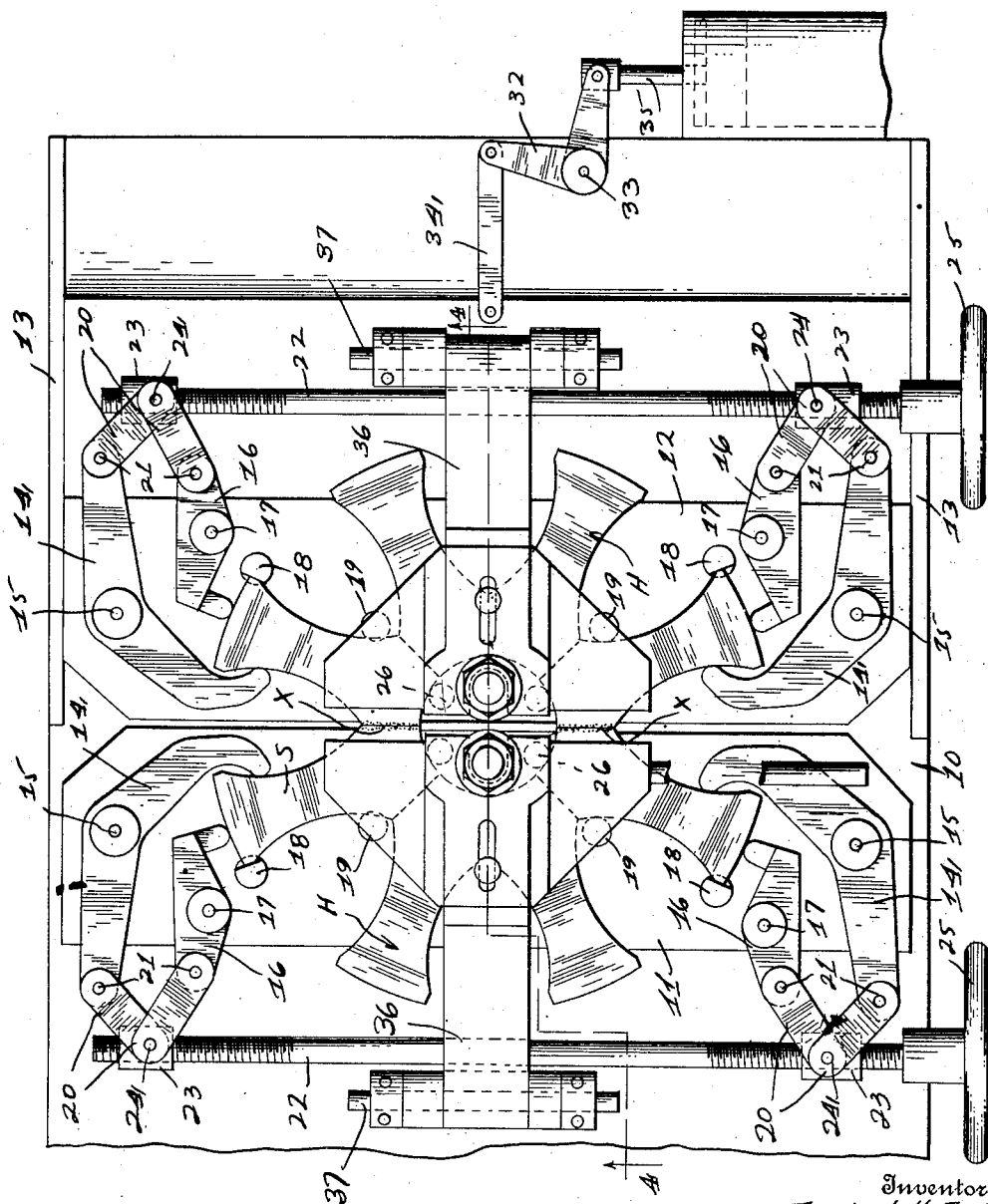


Fig. 1.

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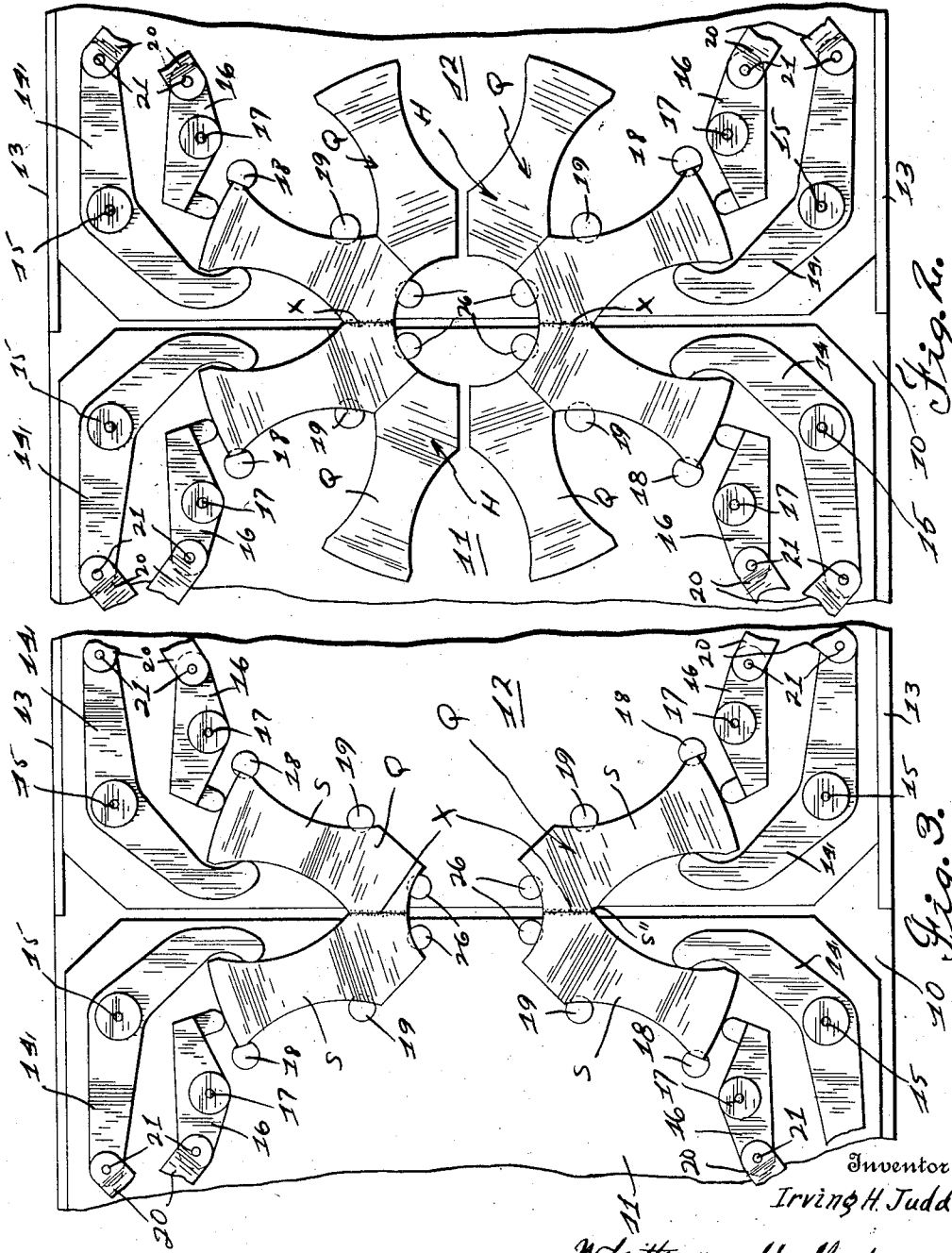
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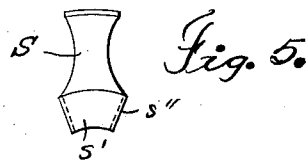
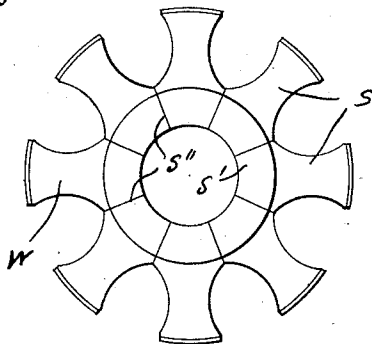
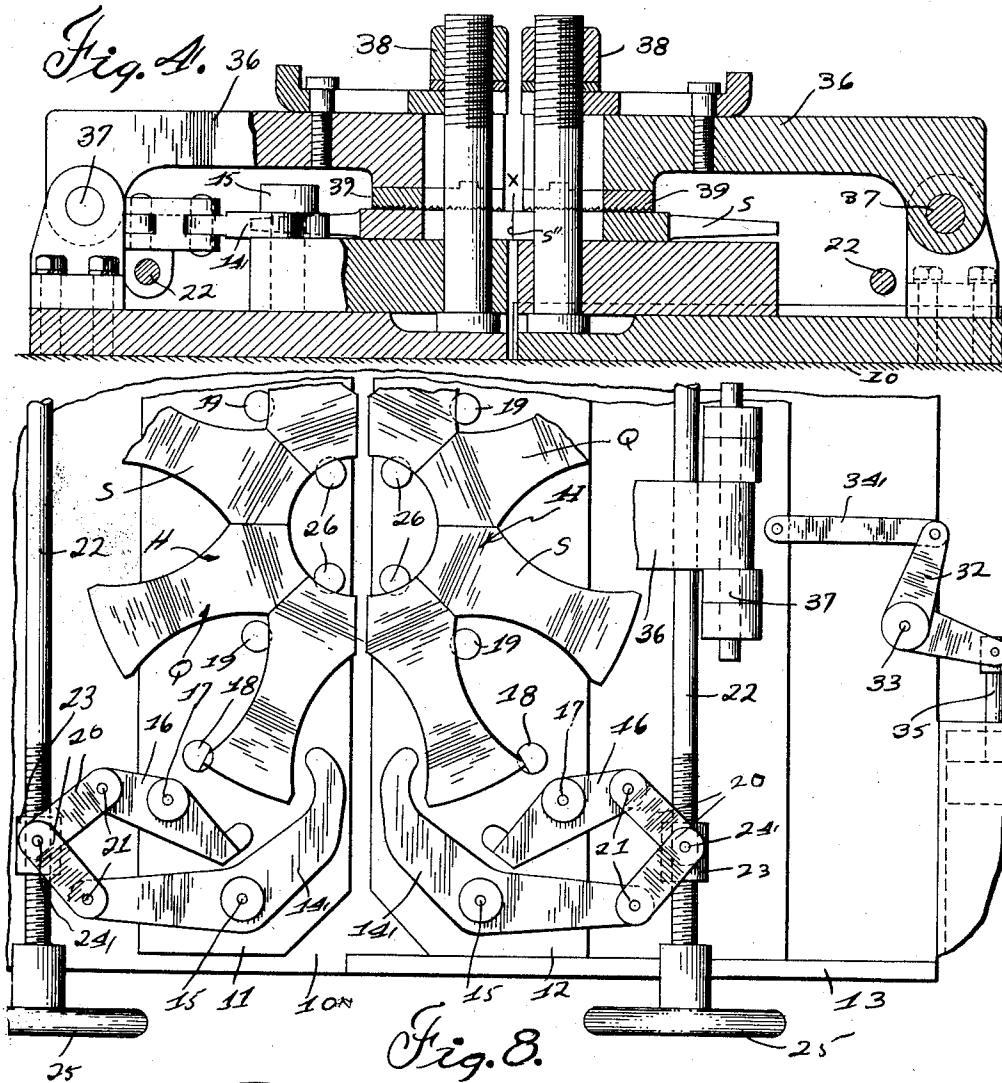
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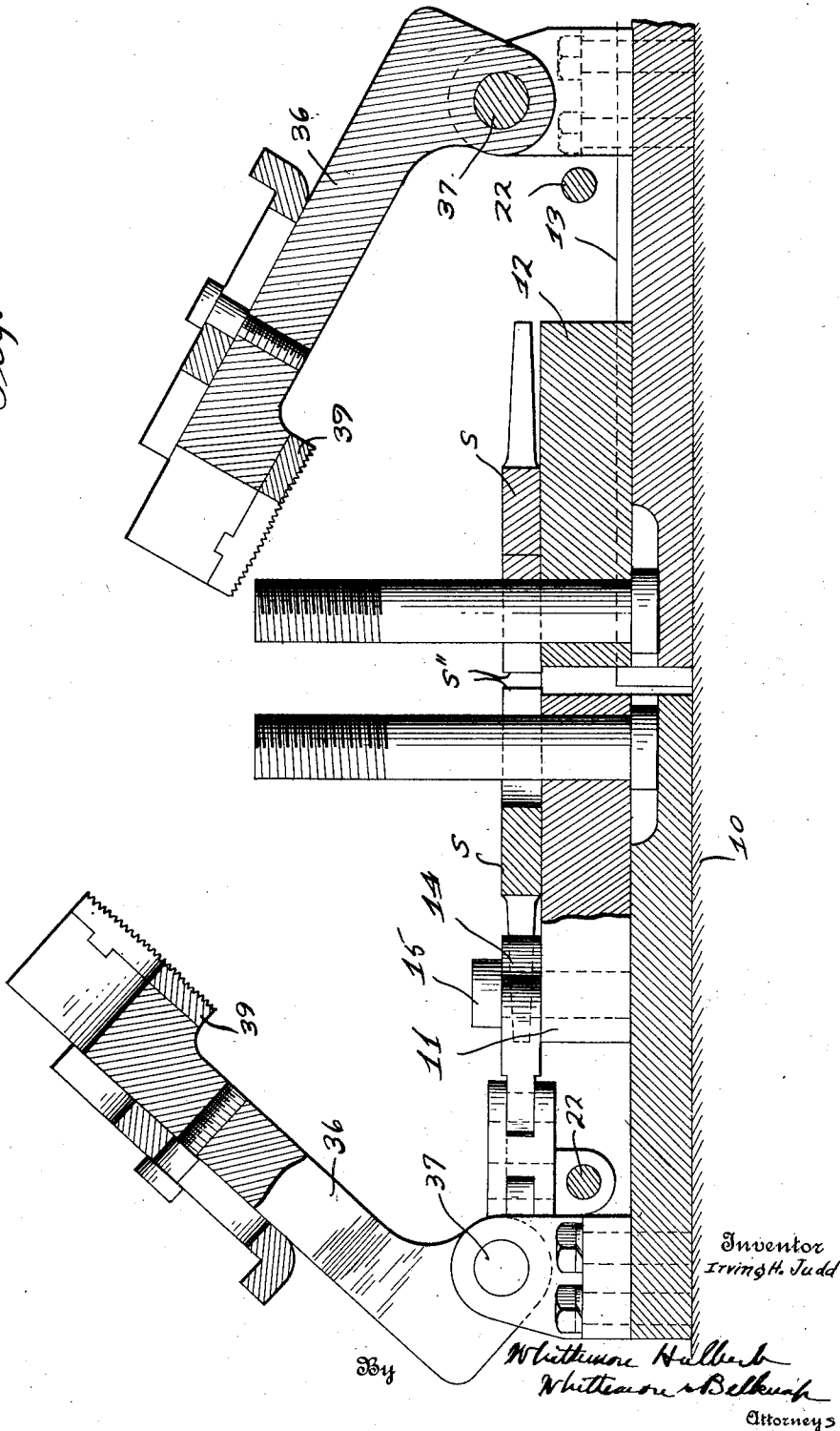
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Fig. 7.



UNITED STATES PATENT OFFICE

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APPARATUS FOR MAKING WHEEL SPIDERS

Original application filed January 17, 1927, Serial No. 161,669. Divided and this application filed May 7, 1928. Serial No. 275,936.

This invention relates to wheel spiders and to the apparatus for making the same and more particularly to an apparatus for making wheel spiders which comprise a plurality of separate spoke members united at the hub by welding.

This application is a division of application Serial Number 161,669 filed January 17, 1927.

10 The present invention has as one of its objects to provide apparatus wherein the uniting of the separate spoke members into a complete wheel spider is facilitated and wherein further the steps of the aforementioned method may be performed with expediency and dispatch, the present apparatus comprising work holders or jigs providing means for receiving and holding the spokes or spider sections in position to permit the ready accomplishment of the welding operation.

15 The several objects, and advantages of this invention will be made more apparent in the accompanying specification, reference being had to the accompanying drawings, wherein:

Figure 1 is a fragmentary plan view of a conventional form of welding machine showing the work holding fixtures in plan view;

20 Figure 2 is a fragmentary view similar to Figure 1 showing the work holding fixtures engaging quarter sections of the wheel spider.

25 Figure 3 is a fragmentary view similar to Figure 1 showing the work holding fixtures engaging single spoke sections of the wheel spider;

Figure 4 is a vertical sectional view taken substantially on the plane indicated by line 4—4 on Figure 1;

30 Figure 5 is an elevational view of one of the spokes; and

Figure 6 is an elevational view of the completed spider.

Figure 7 is a view similar to Figure 4 showing the clamps swung to inoperative position.

45 Figure 8 is a plan view of a portion of the construction illustrated in Figure 1 showing the articulated levers swung to inoperative position.

50 Referring now particularly to the drawings wherein like reference characters indi-

cate like parts it will be noted that there is illustrated, particularly in Figure 1, a conventional form of welding machine 10 upon which stationary and movable work holding fixture plates 11 and 12 respectively are mounted. The movable fixture plate 12 is slidable toward and from the stationary plate 11 along guides 13 provided on the welding machine base.

By referring more particularly to Figures 5 and 6 it will be understood that the problem involved is that of constructing a wheel spider from a plurality of spoke members S, each of which is provided with a hub portion S' of segmental shape in plan view, the end faces S'' of which are adapted to be butt- or flash-welded to the end faces of the next adjacent spoke member to form the completed wheel spider W.

By referring particularly to Figures 1 to 3 inclusive, it will be noted that the work holding fixtures each comprise a plurality of articulated levers arranged in cooperative relation one to another and also cooperating with a plurality of fixed stops. More specifically, each fixture includes a pair of main bell crank levers 14 pivotally mounted as at 15 to their respective plates 11 or 12 and a pair of relatively smaller or shorter bell crank levers 16 pivotally mounted as at 17 on the plates 11 and 12. Projecting upwardly from each of the plates 11 and 12 are pairs of spaced stops or abutments 18 and 19 engageable respectively adjacent the outer free and inner hub ends of the spoke members. The bell crank levers 14 and 16 are arranged in pairs with one end of each of these levers connected by a pair of links 20 pivotally connected thereto as at 21. These links provide means for simultaneously rocking each pair of bell crank levers 14—16 and are operable by means of rotatable screws 22 each provided with a pair of oppositely travelling elements or nuts 23 to which the free ends of the links 20 are pivotally connected as at 24. Thus, upon a rotation of screws 22 by means of handles 25 the travelling nuts 23 will be displaced longitudinally and through links 20 will rock bell crank levers 14 and 16 so as to cause the free ends thereof to engage re-

spectively against the outer and side edges of adjacently positioned spokes S. This holds the spokes in engagement with the adjacent pair of fixed stops 18 and 19 and also
 5 against fixed stop pins 26 so that they are rigidly held in the position illustrated in the drawings. The system of levers and links as just described is duplicated upon the fixed
 10 and movable fixture plates 11 and 12 as will be apparent. The means for moving plate 12 toward and from fixed plate 11 includes a bell crank lever 32 pivotally mounted as at
 15 33 and connected on the one hand by the means of a link 34 to the plate 12 and on the other hand to an operating mechanism 35 here shown as a cylinder and piston. It is obvious, however, that any other operating means such, for instance, as a manually controlled handle may be substituted for the
 20 cylinder and piston illustrated. As the bell crank lever is rocked in one direction it will move fixture plate 12 toward plate 11 and as this bell crank lever is rocked in the other direction movable fixture plate 12 will be
 25 moved away from plate 11.

Associated with each fixture plate is a swinging top clamp 36 pivotally mounted as at 37 and adapted to be swung downwardly into engagement with the top surface of the
 30 spokes or spider sections and to be secured in clamping position by means of nuts 38 threaded upon studs projecting upwardly from the fixture plates. Lateral extensions 39 carried by the clamping member 36 are
 35 provided for engaging the spokes spaced from the longitudinal center of the apparatus.

In Figure 3, two pair of spokes S are shown as being welded along the lines x so that
 40 upon this welding operation four spoke members S are welded into twin spoke sections or quarters Q.

In Figure 2, four quarters Q are mounted upon the fixture plates and are being welded
 45 along the lines x so that after this welding operation four quarters have been formed into two halves H. The two halves are shown supported by the fixture plates in Figure 1 and being welded along the lines x to produce
 50 the whole or complete spider W illustrated in Figure 6.

It will be understood that in each of the three welding operations the units to be connected are mounted respectively upon the
 55 fixtures 11 and 12 whereupon the movable fixture 12 is moved toward the stationary fixture 11 to bring the edge portions S'' into engagement whereupon the parts are butt-welded along the lines x as indicated. It
 60 has been found that in practice the same fixture plates 11 and 12 may be employed in connection with the operations illustrated in Figures 1 and 3 but that the operation in
 65 Figure 2 requires a slightly different positioning of the fixed stops 18, 19 and 26 so that

for this purpose one of each of these stops must be made adjustable if all of the operations are to be performed upon the same machine, or slightly altered fixture plates employed in connection with the second operation. However the same fixture plate as
 70 shown in Figures 1 and 3 could also be used in the operation shown in Figure 2 without being handicapped by the position of the stop pins 18, 19 and 26 by only welding one pair
 75 of quarters Q and one pair of spokes S.

The steps of the method herein involved are no doubt obvious from the preceding description. However, it will be noted that first single spokes are united by butt-welding to
 80 form quarter sections; that the quarter sections are united by butt-welding to form half sections; and that the half sections are united by butt-welding to form whole or completed wheel spiders. Obviously, however, wheel
 85 spiders comprising more or less than eight spokes may be assembled but in such an event the number of welding operations required will accordingly differ.

While the mechanical apparatus involved
 90 herein and described somewhat in detail has been found to render efficient and satisfactory results in practice, nevertheless, it should be understood that various other types of apparatus may be employed with equal facility
 95 without in any wise affecting the method herein involved or the article produced. To this end reservation is made to make such changes in the method and in the details of construction of the article and the apparatus
 100 as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In welding apparatus for forming wheel spiders, a work holding fixture comprising articulated levers, cooperating stops, and means for operating said levers to engage the work.

2. In welding apparatus for forming wheel spiders, a movable work holding plate, work clamping levers mounted upon and movable in a vertical arc above said plate, means for operating said levers, and means for moving said plate.

3. In welding apparatus for forming wheel spiders, a work holding fixture comprising articulated levers, cooperating stops, means for operating said levers to engage the work, and clamping means engaging the top of the work.

4. In a work holding fixture for welding machines for holding spokes and the like, a support, spaced stops adapted to engage the spoke at one side and an end thereof, and clamping levers engageable with the other side and end of said spoke for holding the same against said stops and fixed with reference to said support.

5. In a welding machine for wheel spiders, a work holding fixture for holding the spider

units to be united comprising, a support, abutments projecting from said support engageable with the inner end of the unit and with the side of a radially projecting portion thereof, and means movable into engagement with said unit at points substantially opposed to said abutments for holding said unit in place upon said support.

6. In a welding machine for wheel spiders, a work holding fixture for holding the spider units to be united comprising, a support, abutments projecting from said support engageable with the inner end of the unit and with the side of a radially projecting portion thereof, and clamping levers adapted to be moved into engagement with said unit at points substantially opposed to said abutments for securing said unit in place upon said support.

7. In a welding machine for wheel spiders, a work holding fixture for holding the spider units to be united comprising, a support, abutments projecting from said support engageable with the inner end of the unit and with the side of a radially projecting portion thereof, clamping levers adapted to engage said unit at points substantially opposed to said abutments and means for simultaneously operating said levers.

8. In a welding apparatus of the class described, a work support including a plate, articulated levers movable in a plane substantially parallel to said plate, cooperating work positioning lugs projecting at substantially right angles from said plate, and a common actuating means for said levers.

9. In a welding apparatus of the class described, a plate constituting a work support, levers movable in a plane substantially parallel to said plate, cooperating work positioning lugs projecting from said plate, and actuating means for said levers including linkage terminally connected to said levers, a rotary part, and a slidable part mounted upon said rotary part and connected to said linkage.

10. In a welding apparatus of the class described, the combination with a work support including a plate, work engaging levers mounted to swing over one side of said plate in a plane substantially parallel thereto, means for clamping work upon said plate, means for actuating said levers, and independent actuating means for said clamping means.

11. In a welding apparatus of the class described, the combination with a work support including a plate, work engaging levers mounted to swing over said plate in a plane substantially parallel thereto, actuating means for said plate, means for clamping the work upon said plate including a member movable in an arc at right angles to said plate, and actuating means for said clamping means.

12. In a welding apparatus of the class described, a work support including two plates, one being stationary, the other being movable toward and from the stationary plate, work positioning lugs carried by said plates, articulated levers carried by said plates and engageable with spaced portions of the work, and means carried by said plates for clamping work thereupon.

13. In a welding apparatus of the class described, the combination with a work support, of means for holding work upon said support including levers mounted to swing in a plane parallel to said support, and clamping members operable independently of the means aforesaid and mounted to swing in a plane at right angles to said work support.

14. In a welding apparatus of the class described, the combination with a work support including a plate, of a plurality of spaced work positioning lugs projecting from said plate, a plurality of levers movable in a plane at right angles to said lugs to cause the work to be engaged with the lugs, and means movable in a plane parallel to said lugs for holding the work between said lugs and levers.

In testimony whereof I affix my signature.
IRVING H. JUDD.

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