Oct. 11, 1932. J. M. NICKELSEN 1,881,877

METHOD OF MANUFACTURING CONNECTERS

Filed July 14, 1930 2 Sheets-Sheet 1

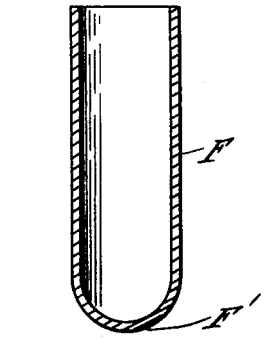


Fig. 7.

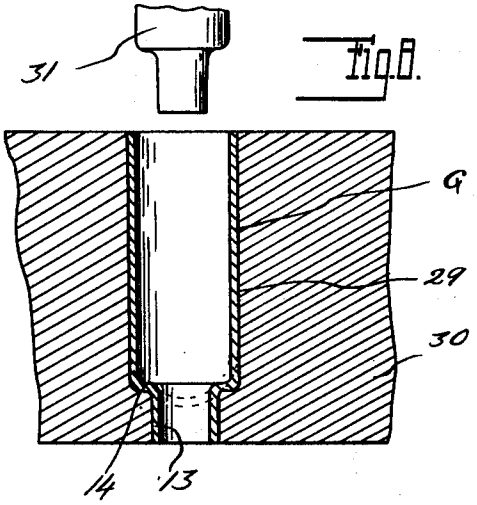


Fig. 8.

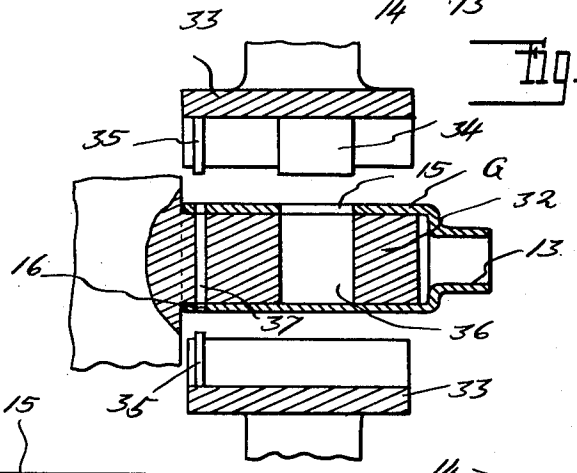


Fig. 9.

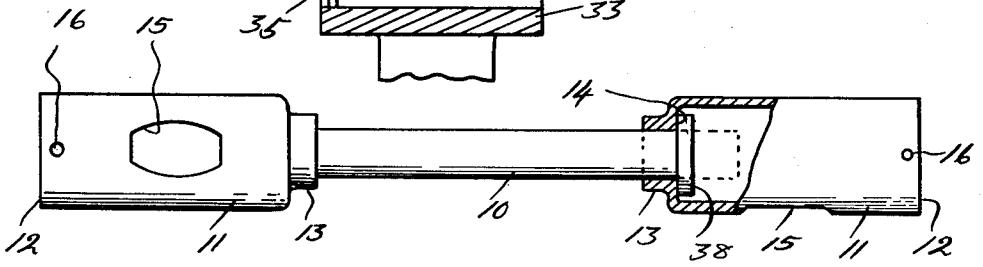


Fig. 1

INVENTOR

John M. Nickelsen

BY

W. Cutten & Hulbert & W. Cutten & Belknap

ATTORNEYS

Oct. 11, 1932. J. M. NICKELSEN 1,881,877

METHOD OF MANUFACTURING CONNECTERS

Filed July 14, 1930 2 Sheets-Sheet 2

Fig. 3.

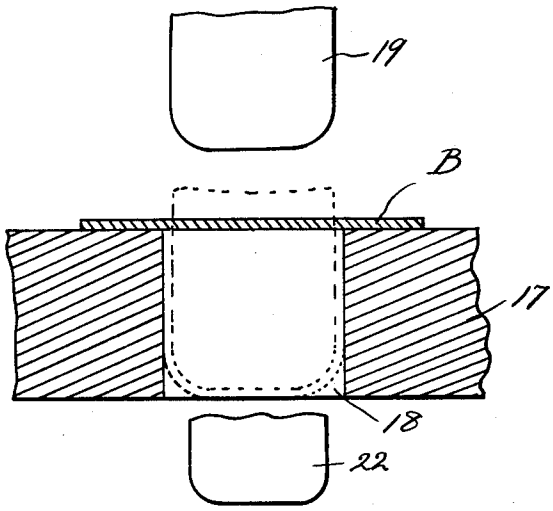


Fig. 4.

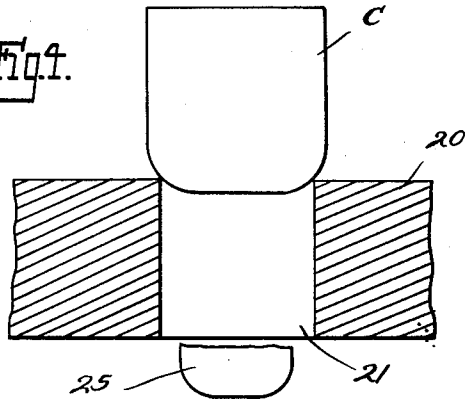


Fig. 5.

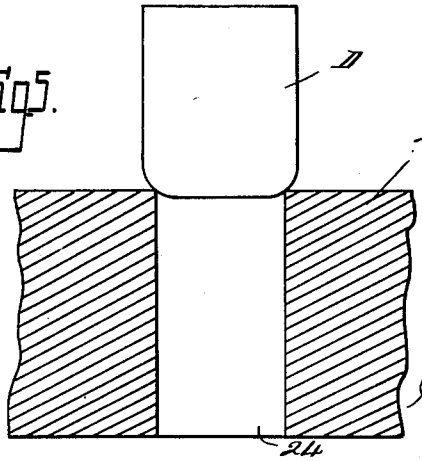
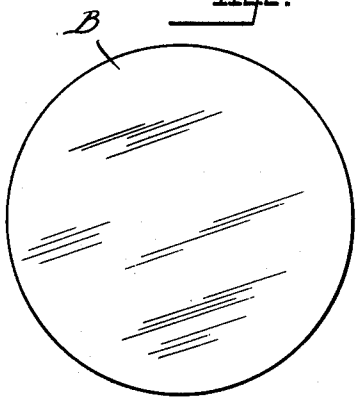


Fig. 2.



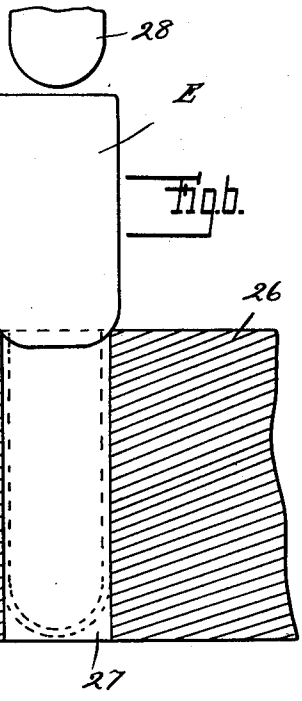


Fig. 6.

INVENTOR

John M. Nickelsen

BY

Cushman, Hulbert & Cushman & Belknap

ATTORNEYS

Patented Oct. 11, 1932 1,881,877

UNITED STATES PATENT OFFICE

JOHN M. NICKELSEN, OF MONROE, MICHIGAN, ASSIGNOR TO MONROE AUTO EQUIPMENT COMPANY, OF MONROE, MICHIGAN, A CORPORATION OF MICHIGAN

METHOD OF MANUFACTURING CONNECTERS

Application filed July 14, 1930. Serial No. 467,937.

This invention relates to a method of manufacturing connecters for shock absorbers and more particularly to the method of manufacturing connecters of the type shown and described in my copending application, Serial No. 372,260.

The invention has as one of its principal objects to simplify, cheapen and otherwise render more efficient the method of manufacturing connecters of this type.

The several steps of my improved method will be made more apparent especially when considered in connection with the accompanying drawings, wherein

Figure 1 is a sectional elevational view of a finished connecter manufactured in accordance with my improved method;

Figure 2 is a plan view of the blank from which the thimble or end member of the connecter is formed;

Figure 3 is a sectional elevational view showing semi-diagrammatically the first step of the method;

Figure 4 is a similar view showing semi-diagrammatically the second step of the method;

Figure 5 is a similar view showing semi-diagrammatically the third step of the method;

Figure 6 is a similar view showing semi-diagrammatically the fourth step of the method;

Figure 7 is a sectional view showing the blank or work piece produced as a result of the fourth step of the method;

Figure 8 is a sectional elevational view showing semi-diagrammatically the fifth step of the method, and

Figure 9 is a similar view showing the last step of the method.

By reference to Figure 1 it will be noted that the connecter, which is adapted to connect the load transmitting arm of the shock absorber to one of the relatively movable vehicle parts, comprises a rod 10 provided at both ends with substantially tubular shaped thimble members 11. The thimble members are in the form of elongated tubular bodies open at one end as at 12 and provided at the other end with an open flanged portion 13 of a smaller diameter than the main portion of the body. This portion of reduced diameter provides an annular shoulder 14 for a purpose to appear more fully hereinafter.

Each thimble member is provided intermediate its ends with an aperture 15 and adjacent its open end with a pair of aligned apertures 16.

The thimble member is produced from a round blank B, see Figure 2, which in the first stamping or drawing operation is placed upon a die 17 provided with an aperture 18 and is forced therethrough by means of a punch or movable die member 19. This produces a cup-shaped blank C which in the second operation is placed upon a die member 20 provided with an aperture 21 of somewhat smaller diameter, the blank C being forced therethrough by means of a punch or movable die member 22. This operation produces a blank D of tubular cup-shape formation but of smaller diameter. This blank is placed upon a die member 23 provided with an aperture 24 of somewhat smaller diameter than the previous die member and the blank is forced therethrough by means of punch or movable die member 25. This produces a tubular cup-shaped blank E of still smaller diameter which is placed upon a die member 26 provided with an aperture 27 and forced therethrough by means of a punch or movable die member 28. This operation produces the blank F as shown in Figure 7 which is in the form of an elongated tubular cup-shaped member closed at one end as illustrated.

This blank F is placed in the recess 29 of a die member 30 and is subjected to a punching operation by means of a punching die 31 which pierces the closed end F′ of the blank F and forms a flange 13. This produces a blank G of the final shape and configuration, the punch during this latter operation also producing the shoulder 14. The blank G is then placed upon a mandrel or the like 32 and is subjected to the action of a pair of punching dies 33 one of which is provided with a punch 34 which produces the aperture 15, both of the dies being provided with punches 35 which simultaneously produce the opposed aligned apertures 16. The mandrel 32 is re-

cessed as at 36 and 37 to accommodate the punches 34 and 35 respectively.

With the thimble thus produced there is associated the rod 10 in the manner suggested in Figure 1, this rod being of a diameter to fit within the flanged end 13 of the thimble. Thereupon the end of the rod, which is shown dotted at the right hand of Figure 1, is upset either cold or hot to produce the head 38 which engages against the annular shoulder 14 provided by the reduced flanged portion 13 to thus unite the rod and thimble.

The connecter thus produced is equipped with blocks of cushion material and a plug for closing the open end 12, (not shown) for instance in the manner suggested in my aforesaid copending application and is used in connection with shock absorbers as also described in my aforesaid copending application.

Reservation is made to make such non-essential alterations in the method herein recited as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In the method of forming connecters, those steps which consist in shaping a flat circular blank by a series of progressively different stamping operations to produce a tubular cup-shaped member closed at one end, subjecting the blank thus formed to a combined stamping and punching operation to pierce the closed end and shape the material adjacent thereto to produce a surrounding flange of reduced diameter, subjecting the blank thus produced to the action of punching dies wherein there is simultaneously produced a pair of opposed aligned apertures adjacent the open end of the blank and an aperture in the wall of the blank intermediate the ends thereof, and inserting the rod in the flanged end of said blank and upsetting the end of said rod.

2. In the method of forming connecters, those steps which consist in shaping a flat circular blank by a series of progressively different stamping operations to produce a tubular cup-shaped member closed at one end, subjecting the blank thus formed to a combined stamping and punching operation to pierce the closed end and shape the material adjacent thereto to produce an annular shoulder and a flange of reduced diameter, subjecting the blank thus produced to the action of punching dies wherein there is simultaneously produced a pair of opposed aligned apertures adjacent the open end of the blank and an aperture in the wall of the blank intermediate the ends thereof and inserting a rod in the flanged end of said blank and upsetting the end of the rod to form a head which engages said shoulder.

In testimony whereof I affix my signature.

JOHN M. NICKELSEN.