

## UNITED STATES PATENT OFFICE

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METHOD OF MAKING ELASTIC METAL  
STAMPINGS

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My invention has to do with the production of improved sheet metal stampings. My aim is to produce a stamping having markedly improved elastic properties and a greatly increased resistance to failure by fatigue. Particularly is such a product of advantage when used in situations where subject to deleterious impacts and long continued or heavy vibration. Stampings forming parts of automobile bodies and of railway cars are peculiarly subject to these conditions. Portions of stampings which are insufficiently elastic to fully recover from moderate impacts result in dents. Vibrations incident to travel on a roadway and weaving of chassis upon which vehicle bodies are mounted keep the stampings continuously under fatigue conditions during periods of travel.

According to the method of my invention I supplement the cold working of those die stamping operations necessary to fabricate the stamping to the form desired to a degree sufficient to permit it to be age hardened to a very material degree. Age hardening of metals, particularly steel, following a very substantial amount of cold work may be utilized to very markedly increase its elastic properties and its resistance to fatigue. Specifically, prior to the stamping operation or operations I cold work the sheet stock of the stamping by roller leveling processes or the equivalent to a degree very materially beyond that required merely to prevent stretcher strains as is common practice, to a degree which when supplemented by the degree of cold working incident to the stamping operations, amounts in total to a value sufficient to enable age hardening to increase the elastic properties of the material and its resistance to failure due to fatigue very substantially more than the age hardening which may result merely as the combined result of the ordinary cold work to prevent stretcher strains and the cold work of the stamping operation. Roller leveling cold works the sheet stock without material change in the dimensions of the stock. Gauge and length remain substantially the same.

Specifically, also I subject the stampings following their fabrication which has been preceded by this extra cold work to a heat treatment to facilitate the aging. Generally speaking, if the sheets are subjected to temperatures 200° F. and

800° F. for a period varying substantially between thirty minutes and one-half minute at the respective extremes, the desired result will be obtained. A very practical range for current production is a heat in the neighborhood of 300° or 400° F. prolonged for a period of three or four minutes. More specifically still, I contemplate deferring this heat treatment until during the cleaning and painting operations on the body of an automobile, and adjusting the degrees and times of application of those temperatures necessary to clean the body for painting and to dry it after painting, to combinedly bring about the foreshortening of the aging.

I am aware that foreshortening of aging and the improvement of elastic properties thereby has been applied to a number of articles heretofore, but so far as I am aware, it has never been applied to steel stampings, especially stampings for automobile bodies nor have steel stampings been produced according to this method in which the necessary amount of cold working to give the desired results is attained by working supplementally to the work required to prevent stretcher strains and to draw the material, and prior to the stamping operation.

Simple though my invention is, it has a very marked value especially in its application to the construction of automobile bodies. Without doubt, it is subject to modification and improvement as its application is spread as a result of its inherent utility. The circumstantial terminology chosen in the light of present knowledge should not therefore impair my exclusive right to the invention in its generic spirit attempted to be expressed in the annexed claims.

What I claim as new and useful and desire to protect by Letters Patent is:

1. The method of fabricating all steel automobile bodies to render them relatively immune from fatigue failure which consists in cold working the sheet steel stock to a material degree in addition to that degree necessary merely for the prevention of stretcher strains, die drawing the parts from the stock so treated, assembling the resulting stampings, and after assembly of the stampings together to form the body, heat treating the completed body to develop the elastic properties possible as a result of the excessive amount of cold work.

2. The method of fabricating all steel automobile bodies to render them relatively immune from fatigue failure which consists in cold working the sheet steel stock to a material degree in addition to that degree necessary merely for the prevention of stretcher strains, drawing the parts from the stock so treated and assembling the resulting stampings to form the completed body, performing cleaning and paint drying operations upon the same, and utilizing the temperatures incident to those operations to bring out during cleaning and paint drying the elastic properties as rendered available by the excessive amount of cold work done.

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| 10 | CLAIMS                       | 85  |
| 15 | DESCRIPTION OF THE INVENTION | 90  |
| 20 | REFERENCE TO OTHER PATENTS   | 95  |
| 25 | STATEMENT OF THE INVENTOR    | 100 |
| 30 | STATEMENT OF THE INVENTOR    | 105 |
| 35 | STATEMENT OF THE INVENTOR    | 110 |
| 40 | STATEMENT OF THE INVENTOR    | 115 |
| 45 | STATEMENT OF THE INVENTOR    | 120 |
| 50 | STATEMENT OF THE INVENTOR    | 125 |
| 55 | STATEMENT OF THE INVENTOR    | 130 |
| 60 | STATEMENT OF THE INVENTOR    | 135 |
| 65 | STATEMENT OF THE INVENTOR    | 140 |
| 70 | STATEMENT OF THE INVENTOR    | 145 |
| 75 | STATEMENT OF THE INVENTOR    | 150 |