Oct. 3, 1933. C. D. JOHNSON 1,928,727

METHOD OF TREATING WIRE

Filed Feb. 24, 1932

Fig. 1.

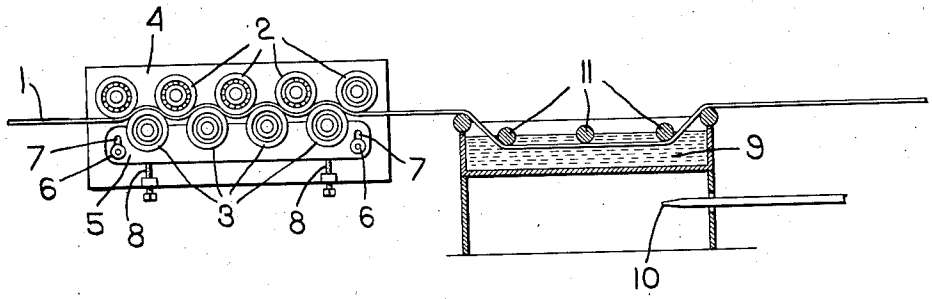
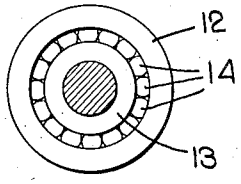


Fig. 2.



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METHOD OF TREATING WIRE

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1 Claim. (Cl. 148—12)

This invention relates to a method of treating wire and has for its object to provide an improved method of treating wire by which both the "elongation" and the elastic limit or "yield point" are increased.

The term "elongation" as used in the wire-making art refers to the amount which wire will stretch before it breaks. The term "yield point" is commonly used to indicate the amount which wire will stretch before it takes a set, in other words, before it has exceeded its elastic limit.

The stretching properties or the elongation of wire can be increased by subjecting the wire while cold to repeated flexing such as would result in passing the wire between two rows of pins or rolls having such relation that the rolls or pins of one row are staggered with relation to those of the other row so that the wire is bent or flexed as it passes between the two rows of rolls or pins. While this operation of cold working or repeatedly flexing the wire results in increasing the stretchability or elongation of the wire yet it also has the effect of reducing the elastic limit or yield point. In other words, such working of the wire reduces the limit or amount to which the wire can be stretched without destroying its ability to come back to its original length after the stretching has ceased.

In accordance with the present invention this reduction in the elastic limit or yield point of the wire which results from mechanically treating the wire to increase its elongation is counteracted by subjecting the wire to a heat treatment of a character tending to increase the elastic limit of the wire. I have found that wire which has been properly worked or flexed to increase its elongation with a resultant decrease in the elastic limit will have its yield point restored if not possibly increased above its original point by subjecting the wire subsequent to the flexing operation to a temperature of from 810° F. to 1300° F., the exact temperature being determined somewhat by the character of the wire being treated.

My improved process, therefore, consists in flexing the wire repeatedly thereby increasing its elongation and subsequently subjecting the wire to a temperature of from 650° F. to 950° F. by which the elastic limit or yield point of the wire is increased.

In order to give an understanding of the invention I have illustrated in the drawing diagrammatically an apparatus by which the improved process can be carried out.

Fig. 1 of the drawing is a diagrammatic view of an apparatus by which the present invention may be practised;

Fig. 2 is a view of one of the rolls of the wire-flexing device.

In the drawing 1 indicates the wire which is to be treated in accordance with my invention. As stated above, the first step is to subject the wire to repeated flexing operations by which the elongation or stretchability of the wire is increased. Such flexing of the wire can conveniently be done by passing the wire between two sets of rolls or pins, the rolls or pins of each row being so arranged relative to the rolls or pins of the other row that the wire will be flexed as it is drawn between the two rows. As illustrated in the drawing rolls are used instead of pins, the rolls of one row being indicated at 2 and those of the other row at 3. The rolls 2 are rotatively mounted on a suitable support 4 and the rolls 3 are shown as carried by a plate or base 5 which is adjustable on the support 4 so that the rolls 3 can be moved toward and from the rolls 2. The plate or base 5 is retained in position by screws 6 which screw into the support 4 and extend through slots 7 in the plate 5 and adjusting screws 8 may be provided for maintaining a proper adjustment of the rolls 3 with relation to the rolls 2.

The rolls of the two rows have such a relation to each other that as the wire is drawn between them said wire will be flexed progressively from one end to the other first in one direction and then the other, this operation resulting in increasing the elongation or stretchable quality of the wire. As stated above, however, such treatment results in decreasing the elastic limit or yield point.

After the wire has been thus mechanically treated for increasing its stretchability then it is subjected to a temperature of from 810° F. to 1300° F. for a suitable length of time, which operation increases the yield point or elastic limit, such increase being frequently sufficient not only to restore the elastic limit to the original point but actually to increase its elastic limit beyond that which the wire had before it was subjected to the flexing operation for increasing its elongation.

Any suitable way of giving the wire the desired heat treatment may be employed without departing from the invention. One simple way is shown herein according to which the wire is drawn through a lead bath which may be heated to the proper temperature. Experiments have shown that this temperature is preferably at least 810° F. and not over 1300° F. The exact temperature

may vary somewhat depending on the particular kind of wire which is being treated and also upon the extent to which it is desirable to increase the elastic limit or yield point of the wire.

The heat treatment may also be carried out by passing the wire through a suitable oven or through a salt bath at a proper temperature, the particular method by which the wire is subjected to this desired temperature being unimportant.

In Fig. 1, 9 indicates a lead bath through which the wire is passed to give it the heat treatment, said bath being kept at the proper temperature by a burner 10. The wire is held submerged in the bath by passing under hold-down rolls 11 as usual when wire is being passed through a bath for the desired treatment.

The rolls 2 and 3 which I prefer to use are in the form of ball bearing rolls so that the wire will receive its flexing action without having undue frictional contact with the flexing means. Each roll is shown as comprisng the outer ring 12 which revolves about a center member 13, there being ball bearings 14 between the two members 12 and 13.

This invention is adapted for the treatment of wire for various uses wherever it is desirable to increase the elongation of the wire without decreasing the elastic limit.

I claim.

The process of treating wire to increase its elongation without decreasing its yield point which consists in flexing the wire progressively from one end to the other and repeatedly first in one direction and then in another a sufficient number of times to increase materially the elongation of the wire, which operation also reduces the yield point and subsequently restoring the yield point to approximately the original degree by subjecting the wire to a temperature between 810° F. and 1300° F.

CHAS. D. JOHNSON.