

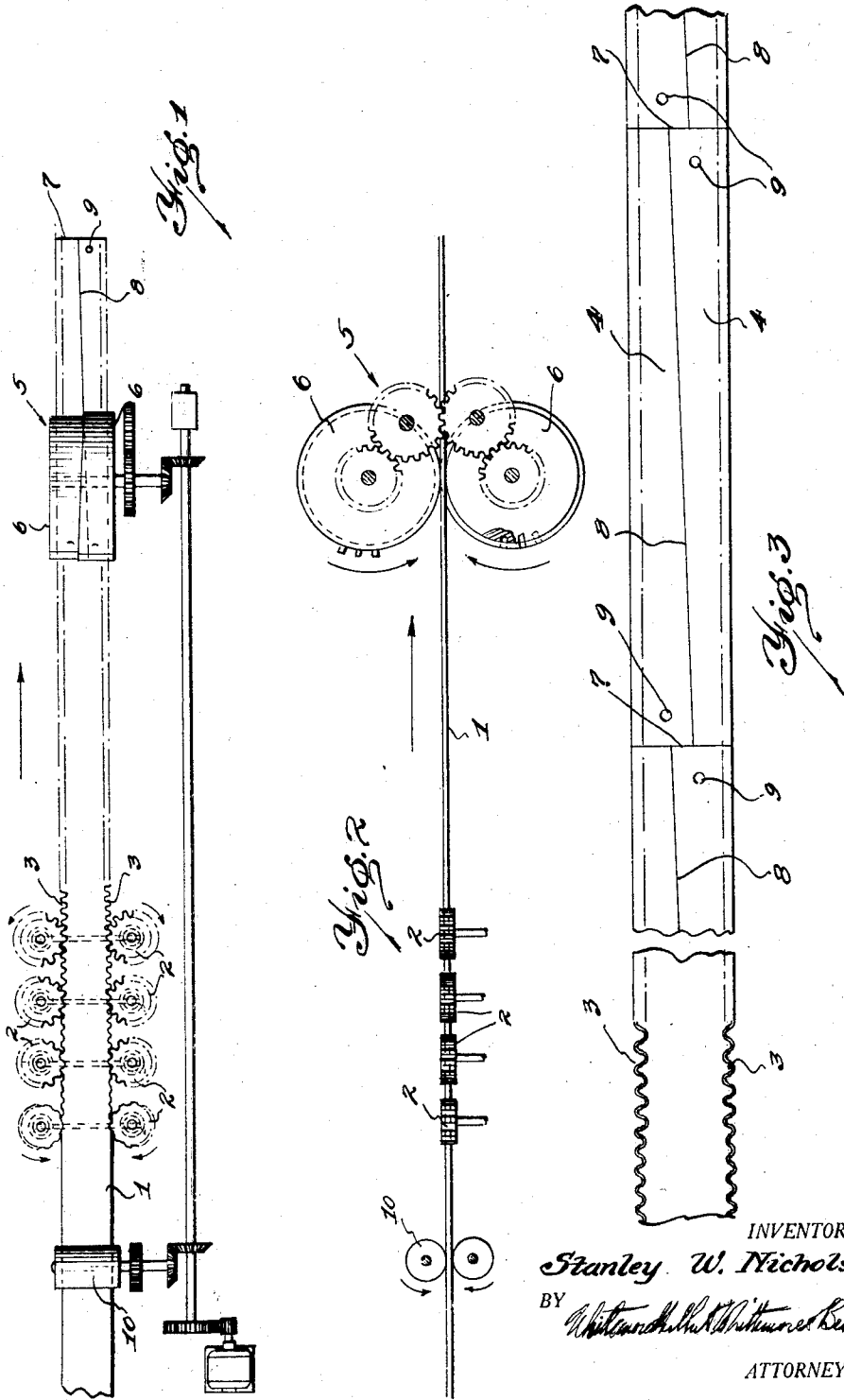
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S. W. NICHOLSON

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METHOD OF FORMING RACKS FOR USE IN WINDOW REGULATORS

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UNITED STATES PATENT OFFICE.

STANLEY W. NICHOLSON, OF TOLEDO, OHIO, ASSIGNOR TO THE DURA COMPANY, OF TOLEDO, OHIO, A CORPORATION OF DELAWARE.

METHOD OF FORMING RACKS FOR USE IN WINDOW REGULATORS.

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The invention relates to the manufacture of racks such as are used in window regulators having pivotal arms and racks for swinging these arms. The main idea embodied in the present invention is the advancement of a metallic strip and the successive forming of teeth in the strip and severing of the strip to produce a number of racks. Another feature is the rolling of the teeth in the metallic strip and the severing of the metallic strip during the continuous advancement of the strip. In addition to these features, the invention has further features as more fully hereinafter described and set forth.

In the drawings:—

Figures 1 and 2 are, respectively, a diagrammatic plan and a diagrammatic side elevation of a machine for carrying out the method; and

Fig. 3 is a plan view of the metallic strip showing the same during its passage through the machine.

1 is a metallic strip or ribbon of indeterminate length which may be mounted upon a reel located in advance of the apparatus for carrying out my method of forming this metallic strip into racks such as are used in window regulators having pivotal arms and racks for actuating these arms. The ribbon is preferably advanced continuously through the apparatus, and during its continuous advancement is first operated upon by the series of rotatable tooth-forming dies 2 which are engageable with the opposite edges of the strips and are arranged in pairs located at different points in the advancement of the ribbon, the distance between the dies of each successive pair progressively decreasing so that the teeth 3 are gradually formed in the opposite edges of the strip. By reason of rolling the teeth in the strip, the width of these teeth is made greater than the original thickness of the strip and furthermore the teeth are provided with hardened bearing surfaces.

The strip is next severed into predetermined lengths and also longitudinally severed to form a pair of sections 4 within the width of the strip. This severing is accomplished by a suitable device 5 which as shown comprises rotatable cooperating rolls 6 engageable with the upper and lower sides of the strip, these rolls having cooperating peripheral dies for transversely shearing the

strip at 7 to predetermined lengths and for also longitudinally severing the strip at 8 between the lines of transverse severing and at an angle thereto. The device 5 is also preferably provided with means for forming the apertures 9 in the strip at the same time the strip is transversely and longitudinally severed, these apertures being located adjacent to the enlarged ends of the sections 4. As shown, the rolls 6 are provided with cooperating projections and recesses for forming these apertures.

While various methods may be used for continuously advancing the strip, I have, as shown in the present instance, provided the positively rotating rolls 10 engageable with the upper and lower sides of the strip immediately in advance of the tooth-forming dies 2. The rolls 6 of the severing device 5 are also preferably positively rotated in timed relation to the rolls 10.

From the above description it will be readily seen that I have devised a method of economically manufacturing racks first, because they are formed in one continuous operation, and second, because the minimum amount of stock is wasted.

What I claim as my invention is:

1. The method of forming racks comprising the advancement of a metallic strip and the successive forming of teeth in and extending longitudinally of the strip and severing of the strip into lengths.

2. The method of forming racks comprising the advancement of a metallic strip and the successive rolling of teeth in the strip and severing of the strip into lengths.

3. The method of forming racks comprising the advancement of a metallic strip and the successive forming of teeth in and extending longitudinally of the opposite edges of the strip and severing of the strip longitudinally and transversely into sections.

4. The method of forming racks comprising the continuous advancement of a metallic strip and the successive forming of teeth in and extending longitudinally of an edge of the strip and severing of the strip into lengths during the continuous advancement thereof.

5. The method of forming racks comprising the continuous advancement of a metallic strip and the successive rolling of teeth in and extending longitudinally of the opposite edges of the strip and severing of the

strip longitudinally and transversely into sections during the continuous advancement thereof.

5 6. The method of forming racks comprising the advancement of a metallic strip and the successive rolling of teeth at different points in its advancement in and extending longitudinally of the strip and severing of the strip into lengths.

10 7. The method of forming racks comprising the continuous advancement of a metal-

lic strip and the successive rolling of teeth at different points in its advancement in and extending longitudinally of the opposite edges of the strip and severing of the strip 15 longitudinally and transversely into sections and at the same time forming apertures in the strip at points between the lines of severing.

In testimony whereof I affix my signature.

STANLEY W. NICHOLSON.