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METHOD OF MAKING CORRUGATED SAW TOOTHED METAL FASTENERS.

APPLICATION FILED JUNE 23, 1910.

985,737. Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

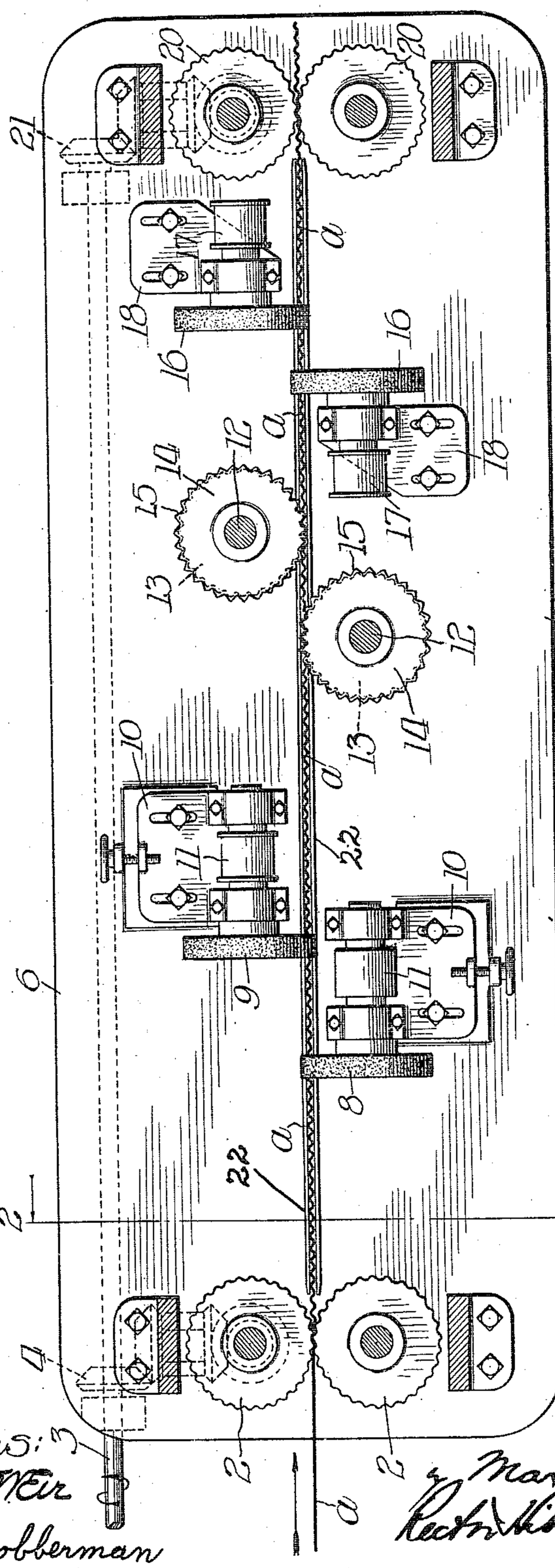

Fig. 1.

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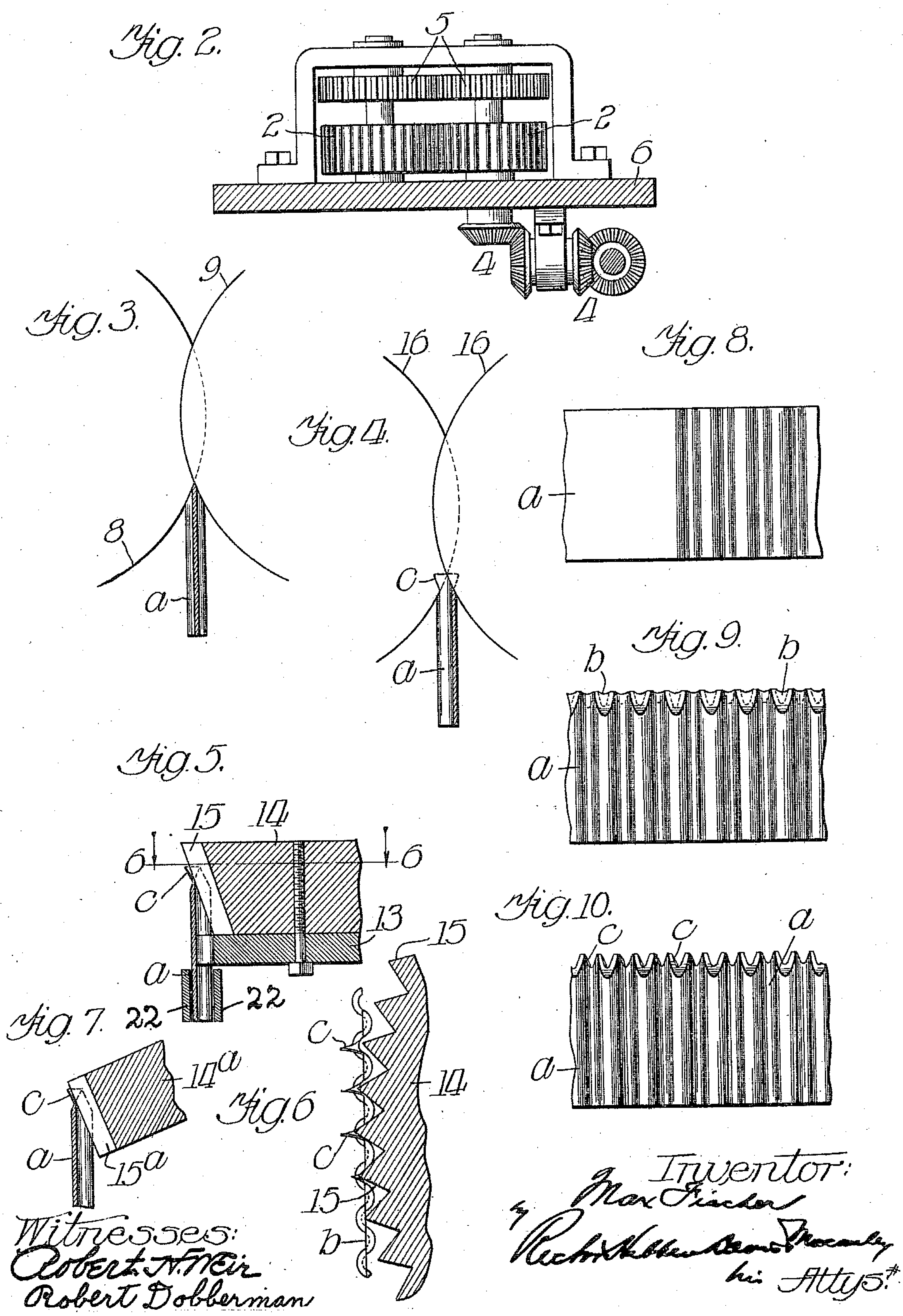

UNITED STATES PATENT OFFICE.

MAX FISCHER, OF NEW YORK, N. Y., ASSIGNOR TO ACME STEEL GOODS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

METHOD OF MAKING CORRUGATED SAW-TOOTHED METAL FASTENERS.

985,737.

Specification of Letters Patent. Patented Feb. 28, 1911.

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To all whom it may concern:

Be it known that I, MAX FISCHER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Methods of Making Corrugated Saw-Toothed Metal Fasteners, of which the following is a specification.

The invention relates to the production of metal fasteners which are corrugated and have a saw-tooth formation along the entering edge produced by beveling on opposite sides, and the method and machine of my invention provide for the turning out of a perfect fastener where the beveling is done by grinding. The difficulty heretofore experienced in the production of corrugated saw-toothed metal fasteners, where grinding has been practiced to effect the beveling, has been that the grinding inevitably caused the formation of a web in the notches and unless such web was removed the efficiency of the fastener was destroyed, or at least so much impaired as to make the article unacceptable to the trade; and furthermore the removal of this web by processes heretofore proposed has been prohibitive of profitable marketing on account of the added expense which would result in the production of the product, the character and uses of the latter being such as to require its production at a minimum expense in order that it may be marketed at a profit.

My invention provides a method whereby, the blank strip having been corrugated and ground on opposite sides along one edge to produce the double bevel formation, the web resulting from grinding will be upset and the notches cleared out and then the burs formed by this upsetting of the web will be removed and the strip delivered ready to be cut up into fasteners having the necessary well-marked saw-tooth formation, supplying penetrating points and draw-cutting edges back of the same,—all by continuous automatic action and by simple and practical expedients neither involving expensive equipment nor demanding close and constant attention of an operator, and furthermore being of a character not requiring frequent renewal of machine parts.

Hence my invention provides for production of the product at minimum expense in the matter of equipment, labor and maintenance, and so permits of marketing at a profit, notwithstanding that the character and uses of the article are such as to necessarily put it in the class of the cheapest sort of goods.

In the drawings which form part of this specification and illustrate a preferred form of means for carrying out the invention and a modification of one of the elements, Figure 1 represents in plan view a series of instrumentalities for producing the article from a plain strip of metal; Fig. 2 is a cross-section on the line 2—2 of Fig. 1; Figs. 3 and 4 are diagrammatic views illustrating the effects produced by certain of said instrumentalities; Fig. 5 is a sectional view illustrating the construction of one of the web upsetting wheels and its effect upon the corrugated and beveled strip; Fig. 6 is a section on the line 6—6 of Fig. 5; Fig. 7 is a view similar to Fig. 5 but illustrating the modification above alluded to; and Figs. 8, 9 and 10 illustrate the metal strip at different stages.

Referring first to Fig. 1, reference numeral 2 designates a pair of horizontally disposed corrugating rolls driven from a line shaft 3 through beveled gearing 4 and operatively connected together by spur gears 5, Fig. 2. The plain metal strip *a* is entered between the corrugating rolls 2 and acted upon thereby to convert the strip into corrugated form and also advance it. At a point above the bed plate 6 in advance of the corrugating rolls 2 there is suitably mounted an emery wheel 8 set to grind away the upper ends of the corrugations at one side of the strip thereby beveling the latter, and a short distance beyond this emery wheel there is mounted a similar wheel 9 to act correspondingly upon the opposite side of the strip. These emery wheels are preferably journaled in heads 10 adjustably mounted upon the bed plate 6, and they may be driven from any suitable source of power through any appropriate connections. The spindles are here illustrated as carrying drive pulleys 11. When the strip *a* emerges from the corrugating rolls 2 it appears in side view as illustrated by the right-hand portion of Fig. 8, and when it has passed the emery wheels 8 and 9 it will appear as in Fig. 9, the corrugations having been ground away, beveling the strip on opposite sides along the top edge and outlining notches in the corrugations, which notches, however, will be filled, or substantially filled by thin

webs *b*. Obviously the strip in this form is unsuitable for use as a saw-tooth metal fastener, since no well defined saw-teeth have been produced and the webs *b* will prevent the desired action when the fastener is driven into wood, to-wit that of first penetrating the wood by reason of the presence of a series of points and then cutting through by reason of the action of inclined edges back of the points. Before the strip can be utilized for being cut up into fasteners the notches in the beveled ends of the corrugations must be cleared out.

Referring to Fig. 1, there are loosely journaled on posts 12 rising from the bed plate 6 a pair of wheels for upsetting the web *b*, these wheels being located on opposite sides of the line of travel of the strip and one in advance of the other. Each wheel has the same construction, which is best illustrated in Fig. 5. It comprises a lower disk 13 corrugated to register with the corrugations of the strip *a*, and an upper thicker disk 14 rigidly secured to the disk 13 and beveled at its periphery and having a circumferential series of V-shaped teeth or serrations 15. The wheel is so constructed that, set horizontally with the corrugated disk 13 adapted to register with the corrugations of the metal strip *a*, the serrations or V-shaped teeth 15 will successively enter the notches of the strip and take effect to upset the web *b*, the acting serration or tooth disposing itself obliquely and penetrating to the base of the notch so that the web will be completely upset as illustrated in Figs. 5 and 6, burs *c* being struck up. The serrations 15 of one of the wheels successively engage in the corrugations along one side of the strip *a*, and the serrations of the other wheel similarly engage the strip on the opposite side, so that when the strip has passed both of these specially constructed wheels it will have burs *c* projecting on opposite sides. It only remains then to remove these burs, and inasmuch as the web produced in the grinding is necessarily attenuated more or less, and further weakened in the upsetting produced by the serrated wheels, these burs are of a character to present almost negligible resistance to removal. Therefore their removal may be readily accomplished in various ways. However, in order to insure the desirable smoothness and finish along the sides of the beveled edge of the strip and in the notches thereof, I prefer to employ a second pair of emery wheels similarly related to the strip as are the before described wheels 8 and 9. These finishing emery wheels are designated by the numeral 16 and may be driven in any suitable manner. Their spindles are here shown as equipped with pulleys 17 and the wheels are shown journaled in adjustable heads or holders 18. Beyond these finishing emery wheels there are mounted above the bed plate 6 a pair of corrugated rolls or wheels 20 similar to the before described rolls 2, though not performing any corrugating but merely serving as feed rolls. They are driven the same as are the corrugating rolls 2, from the line shaft 3 through bevel gearing 21 and connected spur gears similar to those designated 5 in Fig. 2. These feed rolls 20 of course keep step with the corrugating rolls 2 and these two sets of corrugated rolls obviously serve to steadily and continuously advance the strip, subjecting it to the action of the intermediate instrumentalities comprising the two sets of emery wheels and the web upsetting wheels. The advance of the strip to the second set of emery wheels and the striking of the burs *c* against the latter will go far toward removing the burs and in practice the burs will be to a very great extent removed by this mere contact. However, as the strip advances there is a grinding action of the emery wheels 16 which effects a desirable finishing operation, the burs being more cleanly eliminated and the draw cutting edges in the notches of the strip being therefore left in better shape, *i. e.* without irregularities.

In order to feed a strip in a direct path between the grinding and other operating wheels and to hold the strip against the various instrumentalities for their action upon it, I provide a pair of guides 22, see Figs. 1 and 5, which are spaced apart a sufficient distance to permit the passage of the strip without undue friction and yet to support it in an upright position notwithstanding the pressure exerted upon it by the grinding of the wheels.

In Fig. 10 a section of a strip is represented, the left-hand portion of which appears substantially as it would just after passing the web upsetting wheels, whereas the right-hand portion represents the appearance of the strip after passing the finishing grinders 16.

Fig. 7 illustrates a modification in the form and arrangement of the web-upsetting wheel. Here it is illustrated as a single disk 14^a set obliquely, with its V-shaped teeth or serrations 15^a extending at right angles to its opposite faces. Thus the effective engagement of serrations in the notches of the corrugated and beveled strip *a* is obtained by reason of the oblique setting of the wheel instead of, as in the construction first described, by a bevel of the periphery. It will be understood that in either case the web-upsetting wheels rotate freely, deriving motion from the strip itself. The construction illustrated in Fig. 5 has the advantage over that illustrated in Fig. 7 of more certainly insuring exact seating or serrations in the notches of the strip for the reason that the corrugated disk 13 controls the re-

lationship between wheel and strip by registering with the corrugations of the latter.

It will be obvious that the single-piece web-upsetting wheel might be employed after the manner of the wheel shown in Fig. 5, but having a beveled periphery, or, in other words, that the upper section of the wheel shown in Fig. 5 might be employed without the lower section, either set horizontally with the bevel such as to provide for seating of the serrations in the notches of the metal strip or set obliquely after the manner of the wheel shown in Fig. 7, according to the peripheral formation of the wheel. In short, neither the corrugated disk 13 nor any one specific form or arrangement of the serrated disk or wheel is absolutely essential to a carrying out of the invention, so long as the construction and arrangement be such as to so dispose the teeth or serrations that they will successively seat themselves in the notches and fully upset the web.

What is claimed is:

1. The method of producing metal fasteners consisting in corrugating a strip of metal; double-beveling the corrugated strip at one edge by grinding; upsetting the web in the notches formed by the grinding; and removing the burs formed by said upsetting of the web.

2. The method of producing metal fasteners from a strip of corrugated metal consisting in grinding an edge of the strip at an angle to the plane thereof upsetting the web in the notches formed by the grinding and removing the upset web.

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