

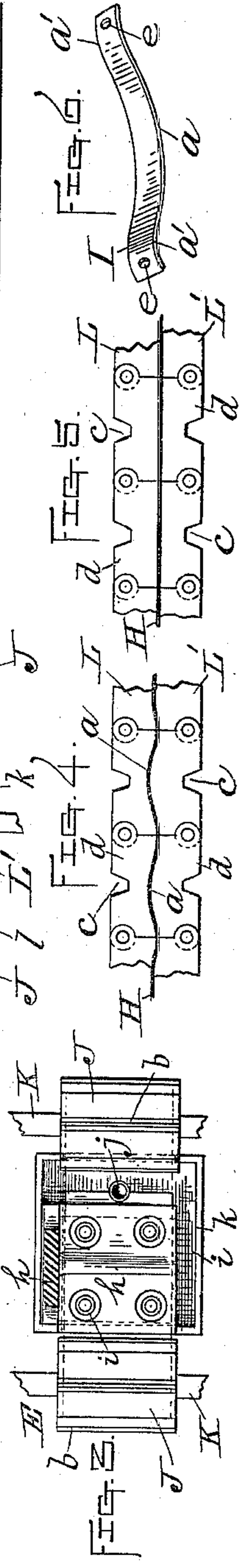
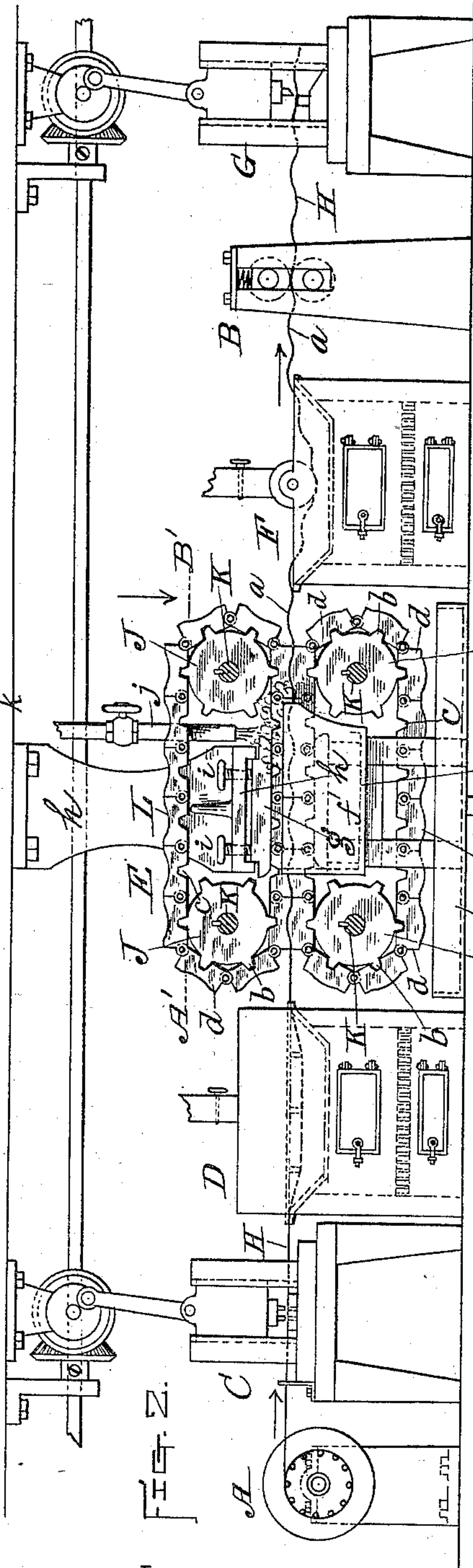
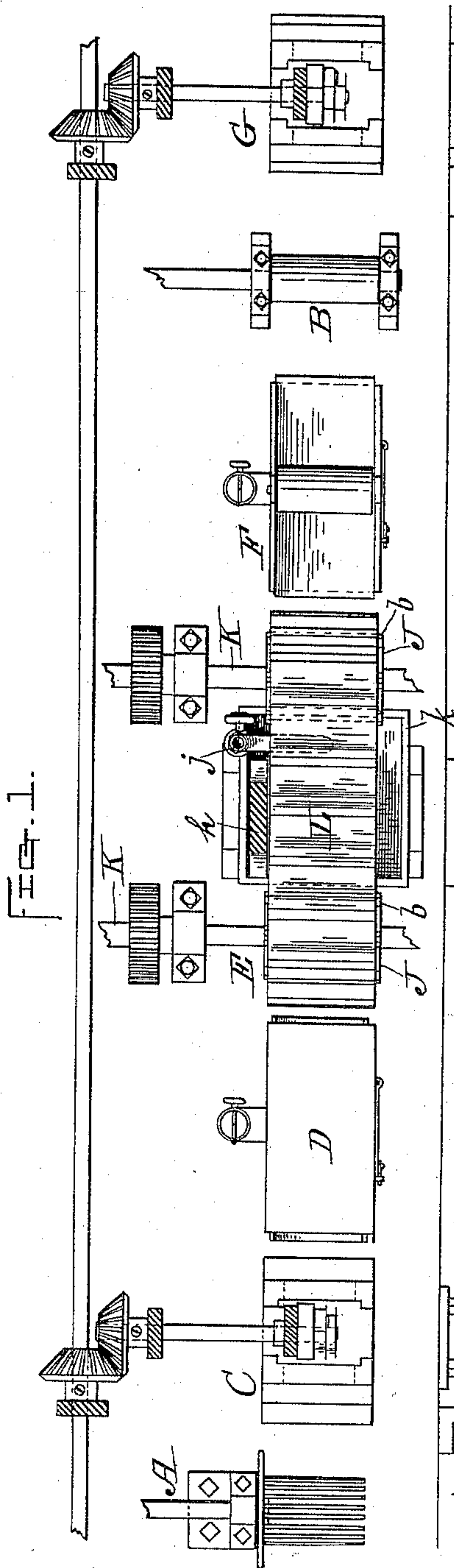
(No Model.)

E. E. FAY.

MACHINERY FOR MAKING METAL SHOE SHANK STIFFENERS.

No. 493,860.

Patented Mar. 21, 1893.



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# UNITED STATES PATENT OFFICE.

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## MACHINERY FOR MAKING METAL SHOE-SHANK STIFFENERS.

SPECIFICATION forming part of Letters Patent No. 493,860, dated March 21, 1893.

Application filed April 20, 1892. Serial No. 429,836. (No model.)

*To all whom it may concern:*

Be it known that I, EDGAR E. FAY, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Apparatuses for Making Metal Shoe-Shank Stiffeners; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings forming a part of this specification, and in which—

Figure 1 represents a plan of so much of an apparatus for making metal shoe-shank stiffeners as is necessary to illustrate my improvements. Fig. 2 is a side view thereof. Fig. 3 is a horizontal section taken on line A'. B'. Fig. 2, looking down as indicated by the arrow, showing a plan of the parts coming below said line, with the linked wire bending blocks, hereinafter described, left off. Fig. 4 represents upon an enlarged scale a side view of parts of said linked blocks where they fit together to perform the bending operation. Fig. 5 is a modification of the construction shown in Fig. 4, showing straight, instead of curved, abutting edges for the purpose hereinafter described, and Fig. 6 is a perspective view of a metal shoe-shank stiffener, such as is made by the use of my improved apparatus.

The object of my invention is to provide an apparatus whereby said shoe-shank stiffeners may be made complete, ready for use, by a continuous and automatic operation and consists in combining a specially constructed, continuous bending or forming machine with suitable means for punching, heating, cooling, tempering and cutting apart the wire as it is continuously drawn forward from a reel by suitable feed-rolls, as will be hereinafter more fully set forth.

To enable others skilled in the art to which my invention appertains to better understand the nature and purpose thereof, I will now proceed to describe it more in detail.

In the drawings, A represents an ordinary reel from which the wire is drawn forward by a set of feed-rolls B preferably arranged at the opposite end of the machine from said reel.

C is a punching machine for punching the usual holes in each end of the stiffeners.

D is a heating furnace; E is my improved

forming and bending machine before alluded to, which is provided with means as will be hereinafter described, for cooling the wire as it is continuously bent and fed forward.

F is a tempering furnace, and G a cutting machine for severing the completed stiffeners from the forward end of the strand as fast as they are moved forward into the proper position to be cut off.

Aside from the bending and forming mechanism and the combination thereof with the various parts of the apparatus described, the independent elements employed in making up said apparatus are old, and I make no claim thereto other than as above noted.

All of said old elements may be employed at once with my improved bending mechanism, or only part of the same, as desired; as for instance, the wire may be treated and bent continuously, and then punched and cut apart by separate operations; or either of said operations of punching and cutting may be independently combined with the aforesaid continuous process.

The special feature of my invention, as before stated, is the bending mechanism whereby the curves *a* are made in the wire H to produce when cut apart between said curved parts, the usual form of stiffeners I, shown in Fig. 6. Said bending mechanism is constructed and operates as follows: Four rolls J, mounted on suitable drive shafts K are arranged transversely to the line of wire, and equi-distant therefrom above and below the same, and an equal, but preferably longer distance apart longitudinally as is shown in Fig. 2. Upon the periphery of each of said rolls are formed a series of longitudinal teeth or flanges *b* equi-distant apart, which act in connection with the rolls, as sprockets to turn the chains of linked blocks L L', which are fitted over the same, and travel in contact, with the wire between them, in passing between the two sets of rolls, being carried around by said teeth or flanges engaging with correspondingly shaped transverse grooves *c* formed in the inner sides of the blocks *d* of the continuous chains L L' aforesaid. Said blocks may be linked together in any suitable manner. Their inner grooved faces are made straight, while their outer faces which come together are curved, the blocks of one chain having



concave curves from the centers nearly out to their ends, and those of the other, convex curves to fit into said concavities. For a short distance in from the ends of the blocks, said curves are flattened to nearly a straight line, to produce the flattened portions *a'* required at the ends of the stiffeners, where the holes *e* are punched therein to secure said stiffeners in place in the shoes.

It will be apparent that, without some means of holding the blocks of the two chains together in their passage between the two sets of rolls, no bending of the wire would be performed except at the two points coming in vertical lines with the rolls, and then, only in an imperfect manner. Therefore, it is necessary to provide some special adjustable means arranged between the rolls, which shall hold the line of linked blocks just enough apart to receive the wire between them in passing through, and thus impart thereto the contour of the blocks, as is best shown in Fig. 4. As various differently constructed devices may be employed to accomplish this result, I do not limit myself to any special construction thereof.

In the drawings I have shown a fixed plate *f* under the abutting line of blocks, and an adjustable plate *g* over the same, the latter being held against longitudinal movement in a fixed bearing *h* and against the blocks by a series of set-screws *i* which turn in said fixed bearing and whose inner ends bear against the top face of said plate, thus admitting of the adjustment thereof to different thicknesses of wire. It is preferable in practice, to combine with said bending operation means for cooling the wire as it is being bent and passes from between the blocks. This may be accomplished by discharging a stream of water or oil from a pipe *j* onto the blocks as they travel forward,—the water flowing over said blocks into a tank *k* through which the bottom blocks pass and thence over-flowing to a larger tank *l* underneath, or otherwise disposed of as circumstances may require. The flow of water or oil into the upper or cooling tank *k* should be sufficient to exceed the outflow at the ends where the blocks pass through, so as to keep the bottom blocks constantly submerged. It is, therefore, obvious that as the hot wire passes in between the bending blocks, the proper shape is imparted thereto, and its temperature is also at once lowered ready for tempering.

In practice, it will be understood, that several strands of wire will be treated by my apparatus at one time.

The operation is, in brief, as follows:—Assuming the reel *A* to be loaded with a coil of wire, of the proper size and shape to produce the desired stiffeners, and drawn therefrom by the feed-rolls *B* through the apparatus, the different stages of the treatment consist first in punching the holes *e* by means of the punching machine *C*, in pairs, a short distance apart, at intervals along the length of the

wire, corresponding to the length of stiffeners; or, in other words, so that one hole of each pair will form the end openings of the completed stiffener when cut from the strand between each pair of openings as hereinafter described. Passing from between the dies of the punching machine, the wire next passes through the heating furnace *D* and is heated; thence through between the lines of bending blocks of the bending machine *E*, where bends sufficient to produce several stiffeners are made in the wire, and said wire also cooled or hardened by the water or oil bath previously described; thence through the annealing bath in furnace *F* to properly temper the same and finally, passing between the cutters of the cutting machine *G*, the completed stiffeners are severed successively from the end of the strand as it is fed forward,—all by a continuous and automatic operation,—the several operating parts of the apparatus being so timed in unison with each other as to perform their several offices with only a slight interruption in the intermittent forward movements of the wire.

The operations of punching, bending and cutting apart the wire, it will be understood, will be done simultaneously, the said wire being stopped but a moment in its progress for the purpose above stated, and when the punching operation is performed independently, the progress of the wire may be continuous, without said intermittent stops, the cutting machine, in practice being made to clip off one stiffener, after another, without stopping the wire.

Although I prefer to combine one or both of the punching and cutting machines with the other parts of the apparatus, I do not limit myself thereto, as the special feature of my invention is the heating, cooling, and tempering combined with that of bending the wire in the class of apparatuses to which my invention appertains. By the application of this feature of my invention it will be apparent that not only can strands of metal be made into the form of shoe stiffeners by a continuous, automatic operation, but also many other articles susceptible of being made from such material may be made with equal facility. I also reserve the right to make the faces of the linked blocks straight as shown in Fig. 5, instead of curved as previously described.

The last described construction is applicable to the treatment of straight wire by my apparatus to produce the same in a uniformly smooth and perfect condition, which is now difficult to perform by the usual treatments, the same being liable to be crinkled or warped in its completed state, which objection, it is obvious, may be entirely removed by my invention.

Having now described said invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. An apparatus for making metal shoe-



shank stiffeners, comprising, in combination, the following elements,—a reel for holding the coil of wire, a punching machine for punching the holes coming at the end of each completed stiffener, a furnace for heating the wire preparatory to bending the same into the form of the stiffeners; mechanism substantially as described for forming said bends; means for cooling or hardening the wire as it is bent; a furnace for tempering the wire; feed rolls for drawing the wire from the aforesaid reel through the machine, and a cutting machine for severing the completed stiffeners successively from the forward end of the strand, as fast as fed forward by a continuous or intermittent, automatic operation, substantially as set forth.

2. In an apparatus for making metal shoe-shank stiffeners bending mechanism consisting of a pair of endless, linked blocks, fitted over suitable toothed, carrying rolls, arranged parallel at a short distance apart, and said linked blocks held in contact with the wire between, for a portion of the distance traversed by them, and having means for supplying a flow of water or oil over the same, to cool the wire, as described, in combination with a heating furnace, and a tempering furnace arranged, one at each side of said bending mechanism, a suitable reel for holding the coil of wire to be operated upon, and suitable feed-rolls for drawing said wire through the apparatus, substantially as and for the purpose set forth.

3. In an apparatus for making metal shoe-shank stiffeners, bending mechanism, consisting of a pair of endless linked blocks fitted over suitable toothed carrying rolls arranged

parallel at a short distance apart and said linked blocks held in contact with the wire between, for a portion of the distance traversed by them, and having means for supplying a flow of water or oil over the same, to cool the wire as described, in combination with a heating furnace and a tempering furnace arranged one at each side of said bending mechanism, a suitable reel for holding the coil of wire to be operated upon; a machine for punching the holes coming at each end of the completed stiffeners, and suitable feed-rolls for drawing said wire through the apparatus, substantially as and for the purpose set forth.

4. In an apparatus for making metal shoe-shank stiffeners, bending mechanism consisting of a pair of endless linked blocks fitted over suitable toothed carrying rolls, arranged parallel at a short distance apart, and said linked blocks held in contact with the wire between, for a portion of the distance traversed by them and having means for supplying a flow of water or oil over the same, to cool the wire as described, in combination with a heating furnace and a tempering furnace arranged one at each side of said bending mechanism, a suitable reel for holding the coil of wire to be operated upon suitable feed-rolls for drawing said wire through the apparatus, and a cutting machine for severing the stiffeners successively from the front end of the strand as fast as fed forward, substantially as and for the purpose set forth.

EDGAR E. FAY.

Witnesses:

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