Sept. 5, 1944. C. F. SHERMAN 2,357,558

PROCESS FOR PRODUCING LINKS FOR MACHINE GUN BELTS AND SIMILAR ARTICLES

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Fig. 1.

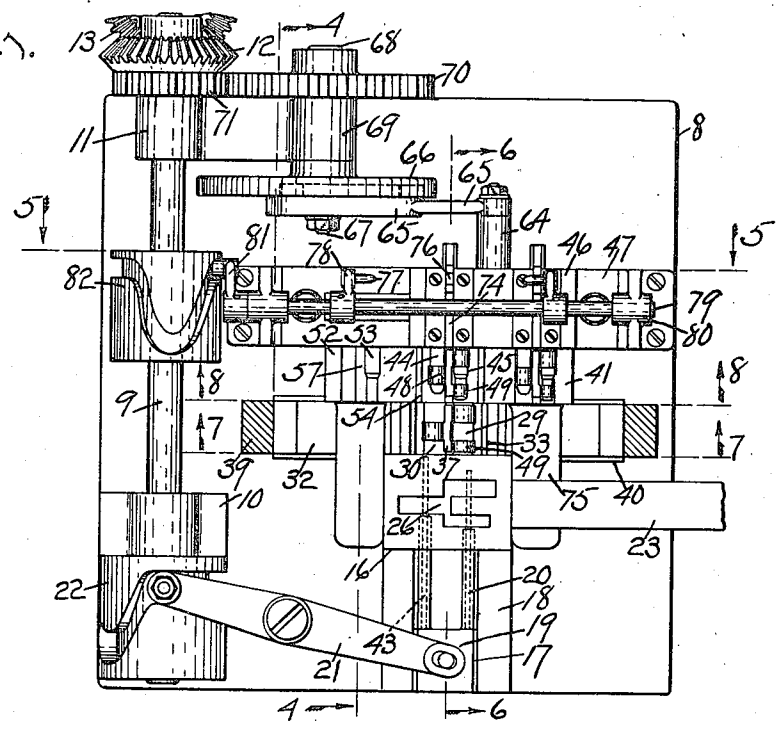


Fig. 2.

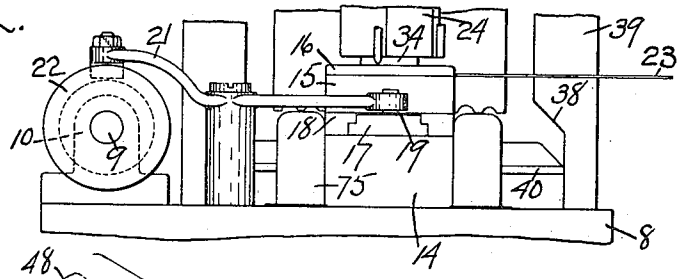
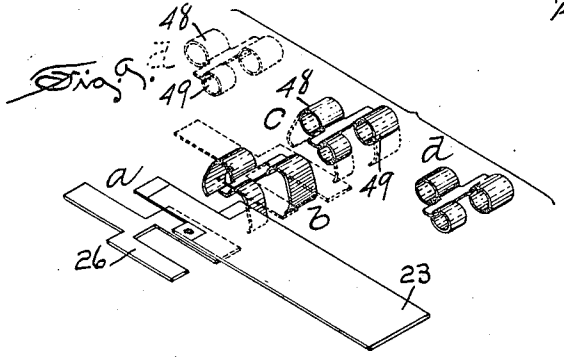


Fig. 3.



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Fig. 3.

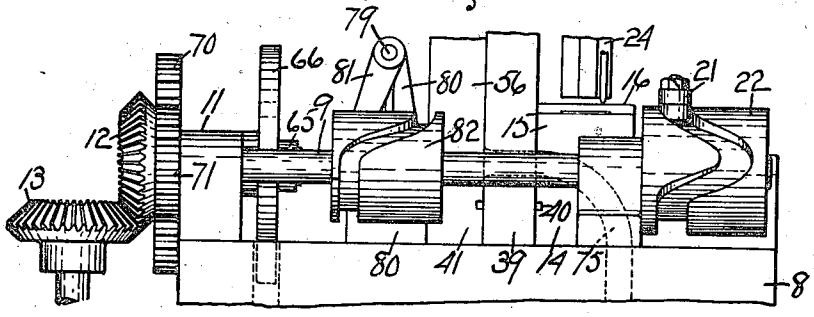


Fig. 4.

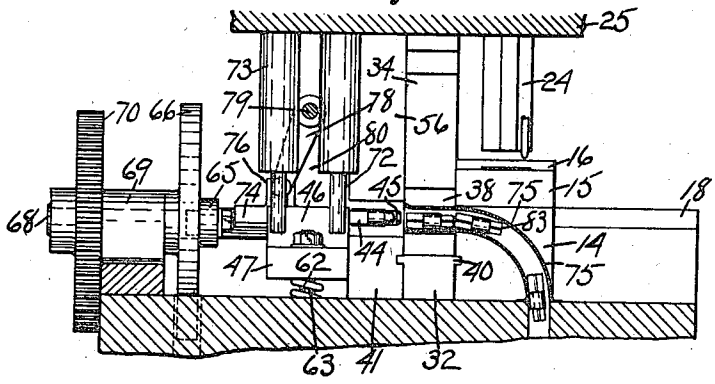
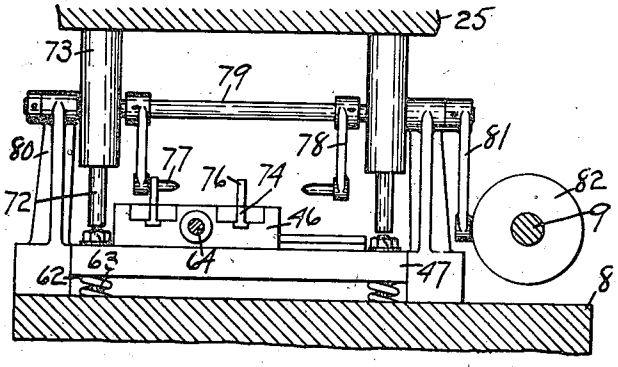


Fig. 5.



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PROCESS FOR PRODUCING LINKS FOR MACHINE GUN BELTS AND SIMILAR ARTICLES

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Fig. 6.

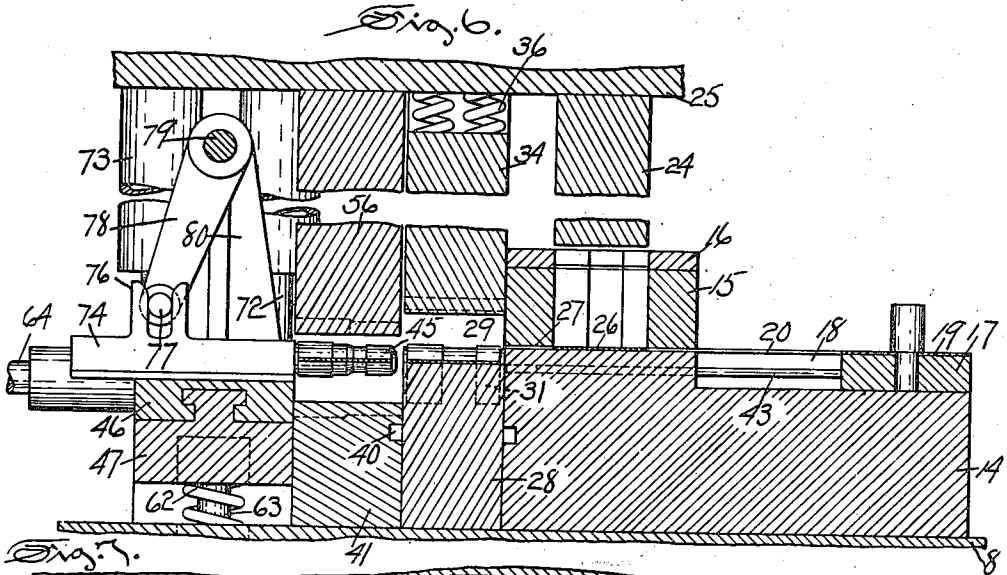


Fig. 7.

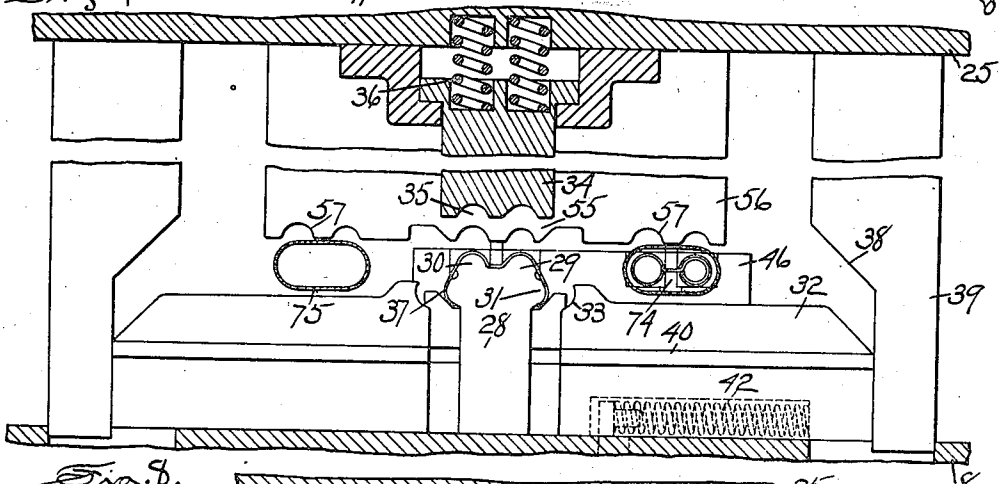
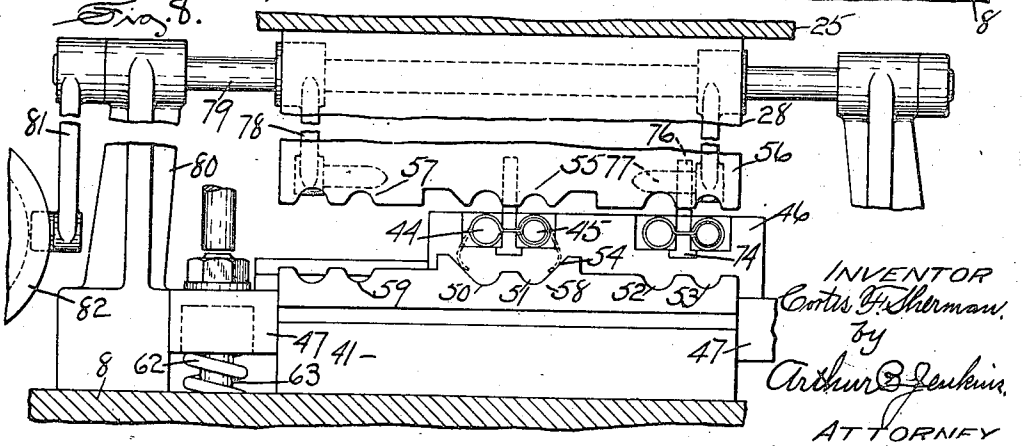


Fig. 8.



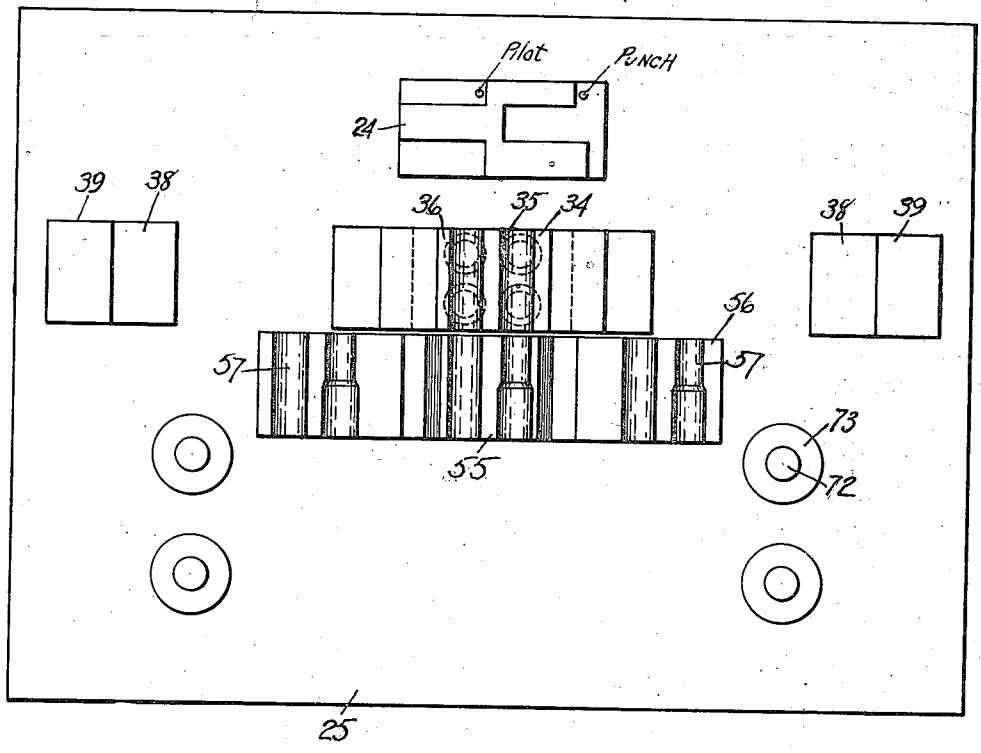
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PROCESS FOR PRODUCING LINKS FOR MACHINE GUN BELTS AND SIMILAR ARTICLES

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Fig 10.



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Patented Sept. 5, 1944

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2,357,558

PROCESS FOR PRODUCING LINKS FOR MACHINE GUN BELTS AND SIMILAR ARTICLES

Cortis F. Sherman, West Hartford, Conn., assignor to The Henry & Wright Manufacturing Company, Hartford, Conn., a corporation of Connecticut

Original application July 6, 1940, Serial No. 344,246. Divided and this application May 10, 1941, Serial No. 392,898

11 Claims. (Cl. 59—8)

My invention relates to a process for rapidly producing links for machine gun belts and similar articles in an efficient and economical manner which utilizes a minimum amount of stock and thereby effects a saving in this respect.

One form of a machine embodying my invention and in the use of which my improved process may be carried out and the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a die holder and parts mounted thereon.

Figure 2 is an end view of the same and including a portion of the punches.

Figure 3 is a side view looking from the left in Fig. 1.

Figure 4 is a view in section on a plane denoted by the broken line 4—4 of Fig. 1.

Figure 5 is a view in section on a plane denoted by the broken line 5—5 of Fig. 1.

Figure 6 is a view on enlarged scale in section on a plane denoted by the broken line 6—6 of Fig. 1.

Figure 7 is a similar view on a plane denoted by the broken line 7—7 of Fig. 1.

Figure 8 is another similar view in section on a plane denoted by the broken line 8—8 of Fig. 1.

Figure 9 is a perspective view illustrating the progressive movements of the blanks during formation by the punches and dies, the latter being omitted.

Figure 10 is a bottom view of the punch.

The figures above described are the same as those embodied in applicant's co-pending application S. No. 344,246, filed July 6, 1940, which has issued as Patent No. 2,266,997, dated December 23, 1941, and from which this case is a division.

In the accompanying drawings the numeral 8 denotes the die holder of my improved machine which may be utilized in the practice of my improved method and which holder it will be understood is mounted on a bolster or bed in a manner common to machines of this type. A cam shaft 9 is suitably mounted in bearings 10—11 upon the die holder 8 and is driven by means of a gear 12 meshed with a driving gear 13, the latter being driven from any suitable source of power as a connection with a crank shaft in the lower part of the machine.

A guide block 14 is supported upon the die holder 8 and a blanking die 15 is mounted upon the guide block as shown in Figs. 2 and 3 of the drawings. A stripper plate 16 is secured atop the die 15 in a manner common to structures of this type. A feed slide 17 is mounted for reciprocating sliding movement upon the guide block as between gibs 18 a feed finger plate 19 being secured to the feed slide that has feed fingers 20 spaced apart and projecting from the inner edge thereof. The feed slide is operated as by means of a feed lever 21 pivotally mounted upon and supported by the die holder 8, one end of the lever being pivotally attached to the feed slide and the opposite end of said lever being engaged with a feed cam 22 secured to the cam shaft, as shown in Fig. 1 of the drawings.

A blank strip 23 is fed in any suitable manner common to machines of this type over the top of the blanking die 15, and a punch 24 operates with the die in a manner common to machines of this type, the punch being secured to a punch holder 25 mounted for vertical reciprocating movement in a manner not herein shown but which will be readily understood by those skilled in the art. The punch operates to cut a blank 26 from the strip 23 and in the embodiment shown herein forces it through the die 16 into a guide groove 27 in the guide block 14 and into the path of the feed fingers 20 by means of which the blanks 26 are passed along the groove underneath the die 15 to a position to be hereinafter described.

A forming die 28 is mounted upon the die holder 8, this die having a pair of rounded forms 29—30 spaced apart on its top, these forms merging into side forms 31 on the sides of the top of the die. Sliding formers 32 are mounted for sliding movement upon the die holder 8, these formers being spring pressed apart as shown in Fig. 7. They have recesses 33 to engage opposite sides of the blank upon the die 28. A plunger 34 supported on the punch holder 25 has recesses cooperating with the rounded forms 29—30, said plunger and sliding formers cooperating to impart a preliminary form to the blanks, as shown in Fig. 7. The sliding formers 32 and the plunger 34 are so relatively timed in their movements that the recesses 35 in the plunger engage the blank upon the forms 29—30 before the recesses 33 on the sliding formers 32 engage the blank upon the side forms 31. The plunger 34 is yieldingly held by means of springs 36 which act during the preliminary movement of the plunger to press the sides 37 of the blanks downwardly into a position opposite the recesses 33, and in the final movement of the plunger 34 the upper end of the plunger strikes the under side of the punch holder 25 and the blanks are then positively seated upon the forming die 28. The sliding formers 32 are operated by former actuating cams 38 upon

former actuators 39 secured to and projecting from the under side of the punch holder 25 as shown in Figures 7 and 10, the cams 38 being positioned to impart movement to the formers 32 after the sides 37 of the blanks have been bent downwardly to clear the formers as hereinbefore described. The formers are provided on opposite sides with guide ribs 40 to engage grooves in the end of the guide block 14 and in a former die 41 to be hereinafter described. The sliding formers 32 are spring pressed apart as by means of springs 42 located in recesses in the bottoms of the formers, as shown in dotted lines in Fig. 7.

After the blanks are stamped to shape and are forced through the blanking die 15 when this form of machine is employed the feed fingers 20 are moved forward by the operation of the lever 21 to push the blanks on to the forming die 28 where a preliminary form is given to said blanks in the manner hereinbefore described. Projecting from the feed slide 17 underneath the feed fingers 20 and extending through a raised part of the guide block 14 are pusher rods 43 which contact with the edges of the partially formed blanks on the forming die 28 and push said blanks from said forming die on to forming fingers 44—45 projecting from a finger supporting slide 46 mounted upon a slide support 47. The forming fingers are arranged in pairs and there are two sets of said pairs projecting from the slide 46. Each finger 44 is arranged to receive a single knuckle 48 on one side of the link and each finger 45 is arranged to receive double knuckles 49 on the opposite side of the link, it being understood that when these links are assembled to form the belt the cartridges form the pintles extending through the links 48—49.

The former die 41 has a pair of preliminary forming cavities 50—51 preferably arranged intermediate the ends of the die and on opposite sides equally spaced therefrom a pair of final forming cavities comprising recesses 52—53. The pairs of cavities last mentioned are of the same general shape and perform the same functions. A guide 54 is formed on opposite sides of each pair of cavities 50—51 constituting the finishing section for the purpose of guiding the blanks down into said cavities and imparting a curved form thereto to curl them around the fingers 44—45. This gives a second preliminary shape to each of the blanks by the action of a preliminary forming section 55 on a punch 56 supported and actuated by the same punch holder 25 as is the punch or plunger 34. The shape of each of the blanks is now nearly completed and requires only a final setting to complete the form. This is effected by finishing sections 57 on the punch 56, said finishing sections being located on opposite sides of the forming section 55 and operating alternately on blanks supported on the two sets of forming fingers 44—45, the finished forming being effected by one section 57 of the punch on one of the sets 44—45 of the forming fingers while the next preceding form is being given on the other set of said forming fingers. That is, in a single downward movement of the punch holder 25 a blank 26 is cut by the punch 24 from the strip 23, a blank is partially formed to shape by the punch 34 on the forming die 28, another preliminary shape is effected by action of the forming section 55 of the punch 56 on one of the pairs of fingers 44 and 45 and a final and setting form producing the finished blank 83 (see Fig. 4) is given by one of the finishing sections 57 of the punch 56 on the other pair of said forming fingers 44—45, it being noted that when this finishing operation is performed on one of the sets of forming fingers 44—45 the next preceding step is taking place on the other of said sets. The former die 41 has a preliminary forming section 58 cooperating with the forming section 55 of the punch 56 and two finishing die sections 59 comprising the recesses 52—53 located on opposite sides of the section 58 and to cooperate with the sections 57 of the punch 56.

To effect this alternate operation upon the blanks upon the two sets of forming fingers 44—45 the latter are supported upon and project from a supporting slide 46 mounted upon a resiliently supported slide base 47 seated on springs 62 mounted on guide pins 63 for guiding the movements of the base 47, as shown in Fig. 6 of the drawings, said pins projecting upwardly from the die holder 8. Reciprocating sliding movement is imparted to the slide 46 by means of a stud 64 projecting from the side of the slide with a slide reciprocating rod 65 pivotally attached to said stud at one end and its opposite end bearing a roller located in a cam groove in a slide reciprocating cam 66, the rod having a slot through which a pin 67 from the cam 66 projects in a manner common to connections of this type. The cam 66 is secured to a shaft 68 mounted in a bearing 69 projecting upwardly from the die holder 8 and having a gear 70 meshing with a pinion 71 secured to the cam shaft 9, as shown in Fig. 1 of the drawings, the gears and pinions being timed to impart proper reciprocating movement to the slide, that is, to locate the forming fingers in their extreme positions for operation of the punches upon the blanks on the fingers when such punches descend for such operation.

The forming fingers with the blanks partially formed thereon are finally located in the depressions in the die 41 by means of plungers 72 extending from within sockets in posts 73 projecting downwardly from the punch holder 25, as shown in Figs. 4 and 5 of the drawings. These plungers are spring seated within the sockets and as the punch holder moves down the ends of the plungers strike the upper surface of the slide supporting base 47 and push it downwardly against the upper side of the die holder 8 and against the tension of the springs 62, there being four of the plungers, two located at each end of the slide supporting base 47, the four springs against which the plungers are seated being strong enough to resist the tension of the two springs 62 and therefore sufficient to compress the latter. This permits continuation of downward movement of the punch 56 to finish its operation after the fingers with the blanks thereon are seated in the recesses in the die 41.

After the blanks are finally formed upon the fingers as hereinbefore described, they are ejected from said fingers by means of ejectors 74 slidably mounted in the supporting slide 46 and operating against the blanks intermediate their ends to push them off from the pins and into chutes 75 along which they are moved by contact with the succeeding blanks to a point of discharge downwardly through the die holder 8 when this manner of discharge is employed, as shown in Fig. 4 of the drawings. A forked finger 76 projects upwardly from each slide in position to receive between the branches ejector actuating pins 77 extending toward each other from the ends of ejector actuating arms 78 secured to and projecting downwardly from an ejector actuating shaft 79 mounted in bearings on the upper ends

of standards 80 projecting upwardly from the die holder 8 at opposite ends of the slide base 47, as shown in Figs. 5 and 6 of the drawings. A rocking motion is imparted to the shaft by means of a shaft actuating arm 81 extending downwardly from the shaft and having a roller at its free end engaged in a groove in an ejector operating cam 82 supported on the main shaft 9, as shown in Fig. 3 of the drawings, the cam being shaped to impart an ejecting movement to the ejectors immediately following the completion of the formation of the blanks. As shown in Fig. 5 the forked fingers 76 on the two ejectors are alternately engaged with an actuator pin 77 as the supporting slide 46 is moved from side to side.

From the foregoing description embodying a progressive explanation of the operation it will be seen on referring to Fig. 9 that the blanks 26 successively cut from the blank strip 23 are moved from the position *a* by operation of the feeding fingers 20 into the position *b* where they are given a preliminary form by means of the punch 34 acting in connection with the forming die 28. From the position *b* the partially formed blanks are moved by the pusher rods 43 into position *c* and on to a pair of forming fingers 44—45. In this position the forming punch 56 acting in connection with the die 41 imparts a further form to the blanks approximating the finished form. From position *c* the pins with the blanks thereon are moved to one of the positions *d* at one side of the position *c* where the final formation of the blanks takes place and from which they are ejected as hereinbefore described, it being noted that the operations at the two positions *d* take place alternately, that is, the succeeding blanks are moved alternately first from the position *c* to one position *d* and second from position *c* to the other position *d*.

It will be noted that as shown in Figs. 4, 5 and 8 the plungers 72 in their raised positions are spaced from the slide support 47 so that downward movement of the punch 56 will encounter the blanks on the fingers 45 before downward movement of the slide support 47 begins. This will cause the opposite edges of the blank to contact the guides 54 and be certainly curled under the forming fingers before downward movement of such fingers begins.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A process for forming cartridge belt links each having knuckles at opposite edges, said process consisting in placing blanks successively upon the end of a forming die and there bending the knuckle portions into partially knuckle form, then successively placing said blanks alternately upon sets of forming fingers and thereupon completing the formation of the knuckles by movement of the sets of fingers with the blanks thereon alternately to opposite and different positions lengthwise of the blanks and thereat setting the knuckles in their final shape.

2. A process for forming cartridge belt links having knuckles at opposite edges, said process consisting in placing a blank having prongs and a shank comprising knuckle portions at opposite edges upon the end of a forming die and partially bending said knuckles thereon and simultaneously therewith bending the knuckle portions of a similarly shaped blank into further partially knuckle form and subsequently successively completing the formation of said knuckles by successive operations alternately on said blanks in opposite and different positions.

3. A process for forming cartridge belt links from blanks each having knuckle portions at opposite edges that consists in partially bending the knuckle parts out of the plane of the blanks and toward each other with the opposite edges curled inwardly, then curling said knuckle parts around a pair of forming fingers in one position, then moving one blank mounted on said fingers to another position to complete formation by setting the knuckle parts to final form and placing another blank on a pair of duplicate fingers in the position first occupied by the first pair of fingers, and then continuing the operation with other blanks successively placed upon said fingers.

4. A process for forming a cartridge belt link having knuckles at opposite edges, said process consisting in cutting in one position a blank from a strip of material, said blank having knuckle portions located at opposite edges of said strip, moving said blank in a direction widthwise of the strip on to a forming die on the upper end of a supporting post, partially forming the knuckle portions on said die, then moving the partially formed blank on to a pair of rigidly spaced forming fingers with the partially formed knuckle portions upon said fingers, and then completing the formation of the blank on said fingers.

5. A process for forming a cartridge belt link having knuckles at opposite edges, said process consisting in cutting in one position a blank from a strip of material, said blank having knuckle portions located at opposite edges of the strip, moving said blank on to a former die comprising an enlargement on the upper end of a die supporting post, partially forming the knuckle portions of said blank on said die and bending the opposite edges underneath said enlargement, then sliding the partially formed blank off from said enlargement on to a pair of rigidly spaced forming fingers with the partially formed knuckle portions upon said fingers, and then completing the formation of the blank on said fingers.

6. A process for forming cartridge belt links having knuckles at opposite edges, said process consisting in cutting in one position blanks from a strip of material, said blanks each having knuckle portions located at opposite edges thereof, moving said blanks from the cutting position on to a forming die of rounded formation and partially forming the blanks thereon, then moving the blanks from said die on to pairs of rigidly spaced forming fingers, partially forming the blanks on said fingers in one position of the latter, then alternately shifting the position of said fingers in opposite directions to receive successively partially formed blanks thereon, and then completing the formation of the blank in different positions of the fingers.

7. A process for forming a cartridge belt link having knuckles at opposite edges, said process consisting in cutting in one position a blank from a strip of material, said blank having knuckle portions located at opposite edges thereof, moving said blank from the cutting position on to a supporting die and partially forming the blank

thereon, then moving the blank from said die on to a pair of rigidly spaced forming fingers, partially forming the blank on said fingers in one position, and then moving the fingers with the blank thereon in a direction flatwise of the blank to complete the formation.

8. A process for forming a cartridge belt link having knuckles at opposite edges, said process consisting in placing a blank upon the headed end of a forming die, partially forming said blank by bending it over said die with the opposite ends of the blank underneath said head, then sliding the partially formed blank edgewise on to a set of forming fingers, and then completing the formation of the link by bending upon said fingers.

9. A process for forming cartridge belt links each having knuckles at opposite edges, said process consisting in placing blanks successively upon the headed end of a forming die, partially forming said blanks by bending them over said die with the opposite ends of each blank underneath said head, then moving successive blanks alternately on to different sets of forming fingers, and then completing the formation of the links on said fingers.

10. A process for forming cartridge belt links each having knuckles at opposite edges, said process consisting in placing blanks successively upon the headed end of a forming die, partially forming said blanks by bending over the end of said die with the opposite ends of the blanks underneath said head, then sliding the partially formed blanks edgewise alternately on to different sets of forming fingers, then bending the blanks successively into partially final form alternately on said sets of fingers, and subsequently completing the formation of the links by bending them alternately on said sets of fingers positioned alternately at opposite ends of their paths of movement.

11. A process for forming cartridge belt links having knuckles at opposite edges, said process consisting in partially forming the knuckle portions of a blank on opposite edges into partially knuckle form, simultaneously therewith completing the formation of said knuckles on a plurality of sets of forming fingers movably mounted to alternately receive said blanks, and then removing the formed blanks from said fingers.

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