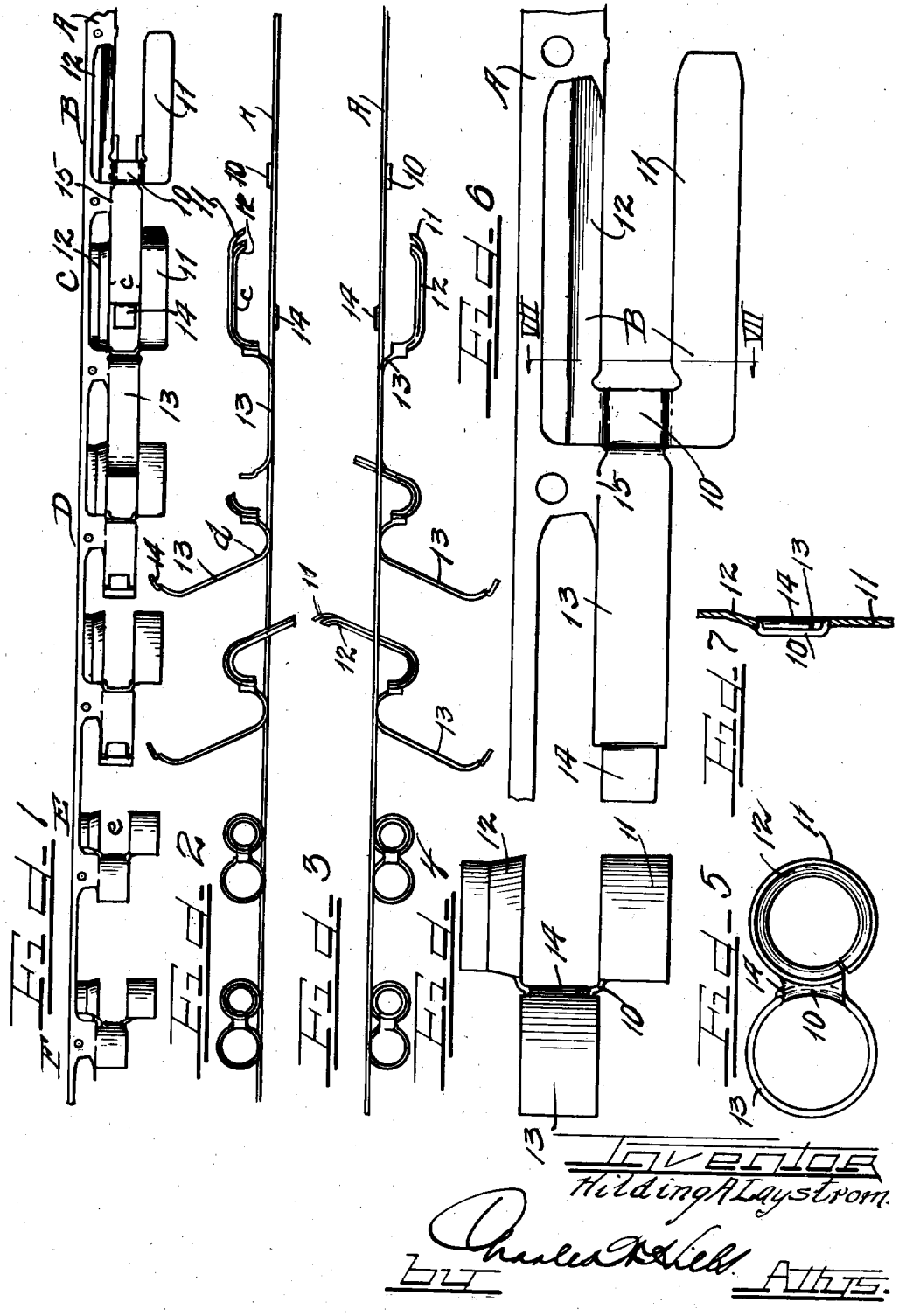
Nov. 4, 1941. H. A. LAYSTROM 2,261,627

METHOD AND MEANS FOR MAKING METALLIC CARTRIDGE BELT LINKS

Filed July 2, 1941 4 Sheets-Sheet 1



Inventor
Hilding A. Laystrom.
By Charles R. Fields Attys.

Nov. 4, 1941. H. A. LAYSTROM 2,261,627

METHOD AND MEANS FOR MAKING METALLIC CARTRIDGE BELT LINKS

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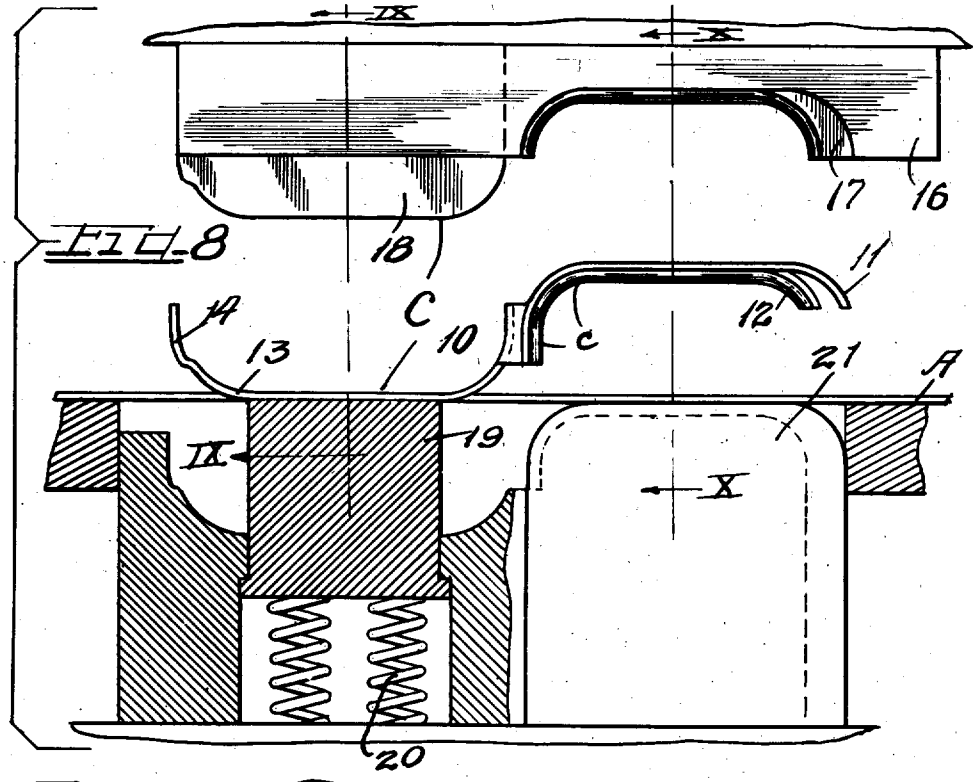


Fig. 8

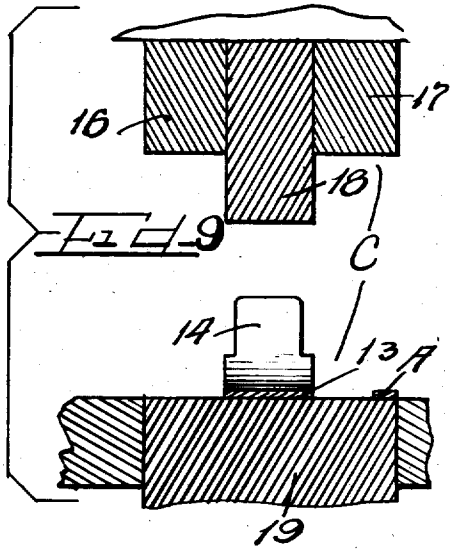


Fig. 9

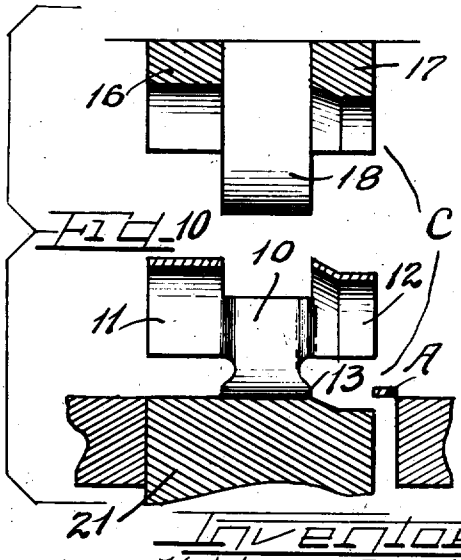


Fig. 10

INVENTOR
Hilding A. Laystrom.
BY Charles R. Hildebrand ATTYS.

Nov. 4, 1941. H. A. LAYSTROM 2,261,627

METHOD AND MEANS FOR MAKING METALLIC CARTRIDGE BELT LINKS

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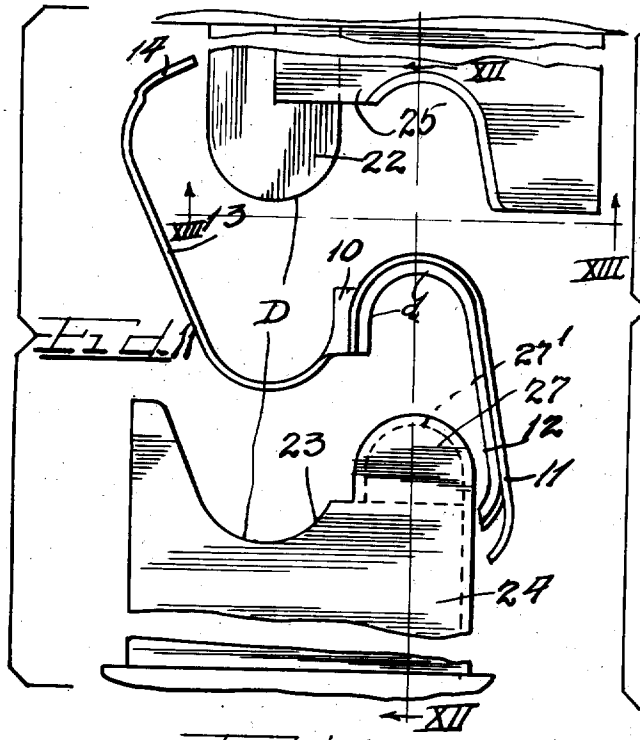


Fig. 11

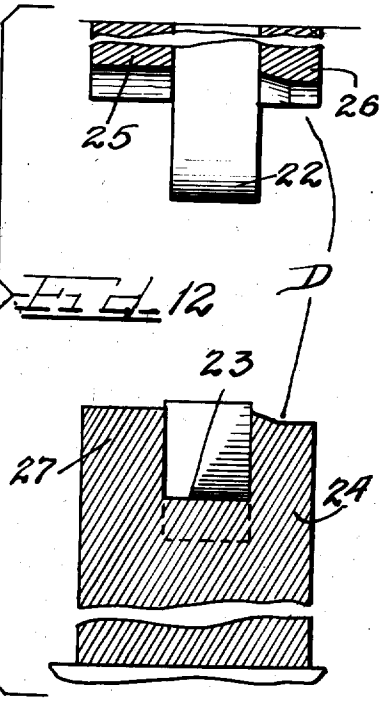


Fig. 12

Fig. 13

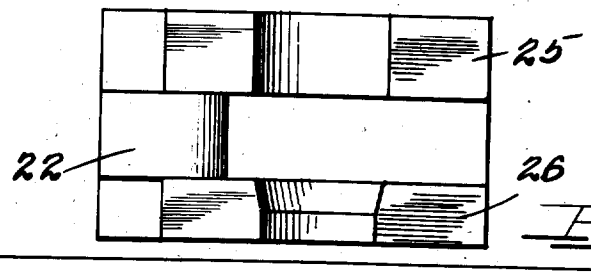
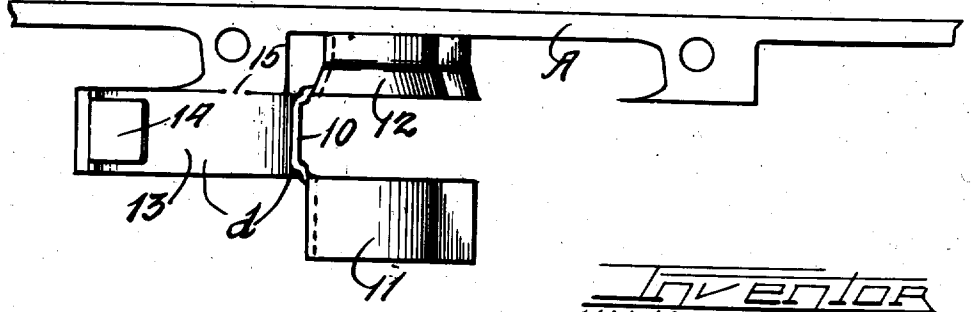


Fig. 14



Inventor
Hilding A. Laystrom.
By Charles O. Fields Atty.

Nov. 4, 1941. H. A. LAYSTROM 2,261,627

METHOD AND MEANS FOR MAKING METALLIC CARTRIDGE BELT LINKS

Filed July 2, 1941 4 Sheets-Sheet 4

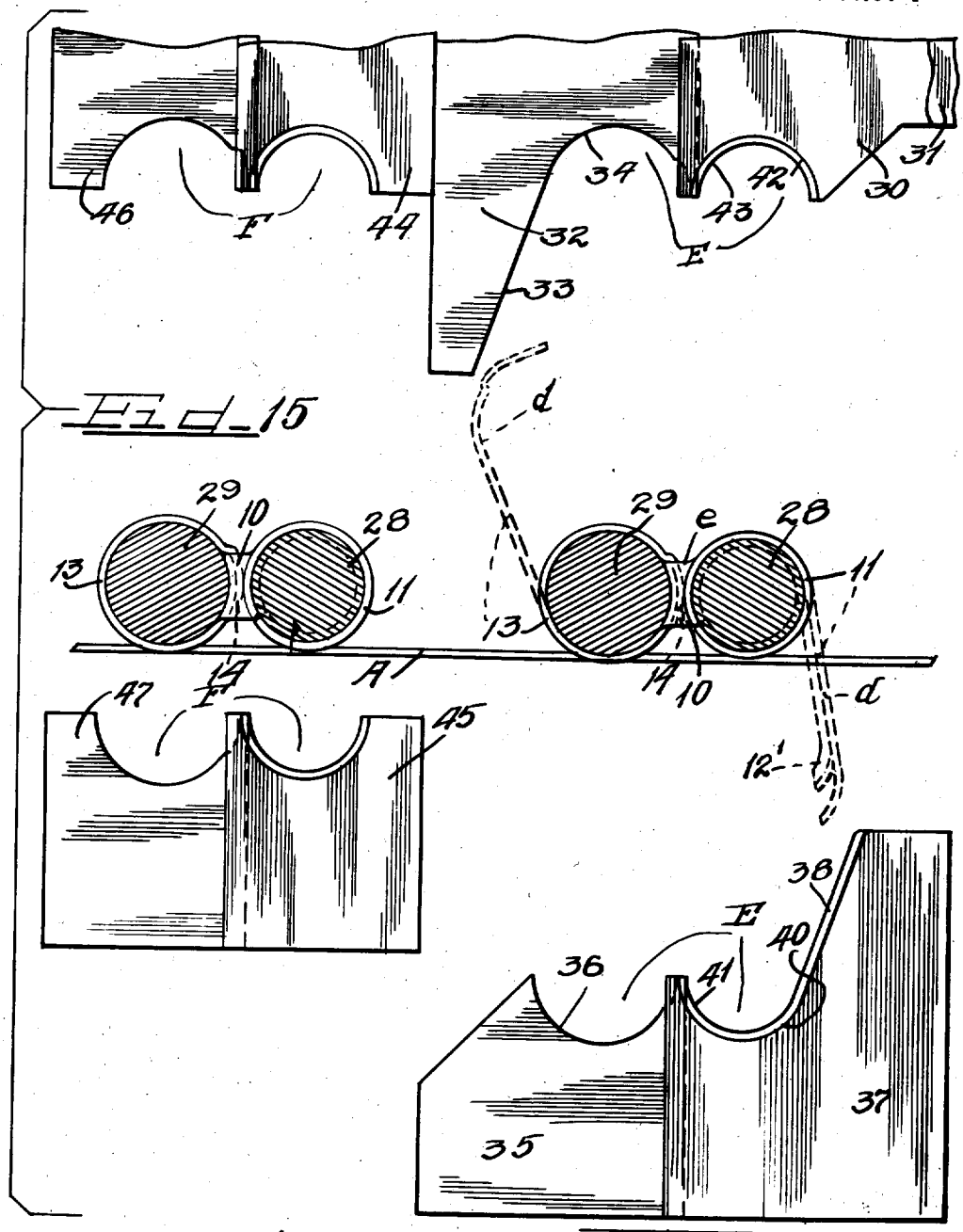


Fig. 15

Inventor
Holding A. Laystrom

By Charles Shields Attys.

Patented Nov. 4, 1941 2,261,627

UNITED STATES PATENT OFFICE

2,261,627

METHOD AND MEANS FOR MAKING METALLIC CARTRIDGE BELT LINKS

Hilding A. Laystrom, Chicago, Ill., assignor to Quality Hardware and Machine Corporation, Chicago, Ill., a corporation of Illinois

Application July 2, 1941, Serial No. 400,756

4 Claims. (Cl. 59—35)

My invention relates to the manufacture of metallic cartridge belt links particularly of the type such as is shown in my Patent No. 2,232,071, dated February 18, 1941, in which type of link axially aligned but spaced apart circular loops extend from one side of the link body for receiving a cartridge, and a circular hinge loop extends from the other side of the body for engagement between the cartridge supporting loops of an adjacent link to receive the middle portion of the cartridge, so that the cartridges will form the link or hinge pins for the successive links which build up the metallic belt.

In the link shown in my patent referred to, the cartridge supporting loop and the hinge loop are formed by progressive die operations into circular form in the same direction from the link body. A stronger and more desirable link will result by bending and forming the cartridge supporting loops in one direction from the link body and by bending and forming of the hinge loop in the opposite direction from the body. The object of my invention is therefore to provide a method and means for simultaneously forming the cartridge supporting loops in one direction and the hinge loop in the opposite direction. The sheet metal blank for a link is subjected to successive die operations in each of which the die elements operate to simultaneously form the cartridge supporting loops and the hinge loop in opposite directions. The progressive formation of a link may be by separate die sets, or by passage of the link through the die fields of a unitary die structure, or some of the link formings may be by separate dies and other formings by passage through a unitary or progressive die structure.

On the drawings I have shown more or less diagrammaticaly a number of die sets for progressively forming the link in accordance with my improved method. On these drawings:

Figure 1 is a plan view showing how the embryo links may be supported from a sheet metal strip during travel of the strip through a unitary die structure, in the manner described in my Patent No. 2,232,071;

Figure 2 is a side view of the strip with the progressive link formations thereon and with the progressive formation of the link being such that in each forming field the cartridge supporting loops are formed downwardly and the hinge loops are simultaneously formed upwardly;

Figure 3 is a side elevation showing how the strip might be passed through a die structure for formation of the cartridge supporting loops upwardly and the simultaneous formation of the hinge loop downwardly;

Figure 4 is a plan view of a finished link;

Figure 5 is an end view of the finished link;

Figure 6 shows a link blank stamped from a stock band;

Figure 7 is a section on plane VII—VII of Figure 6;

Figure 8 more or less diagrammatically shows upper and lower die members for effecting preliminary simultaneous upward and downward bending of the metal for forming the cartridge supporting loops and the hinge loop;

Figure 9 is a section on plane IX—IX of Figure 8;

Figure 10 is a section on plane X—X of Figure 8;

Figure 11 is a side elevation of cooperating die elements for continuing the formation of the loops;

Figure 12 is a section on plane XII—XII of Figure 11;

Figure 13 is an under side view of the upper die element of Figure 11, looking from plane XIII—XIII;

Figure 14 is a plan view of the embryo link formed by the die elements of Figure 11;

Figure 15 shows the die sets and the final forming thereby of the link loops.

Referring to Figures 4 and 5, a link which may be efficiently manufactured in accordance with my process, comprises the body 10 from the ends of which respectfully extend a circular loop 11 and the loop 12 which are axially spaced apart, a loop 13 extending from the edge of the body 10 in a direction opposite to the loops 11 and 12. The loop 11 will receive the body of a cartride, while the loop 12 is contracted as shown to receive the contracted bullet end of a cartridge. The loop 13 is engageable between the loops 11 and 12 of an adjacent link in a chain to receive the middle portion of a cartridge so that the cartridges will form hinge pins for the successive links which build up the supporting belt. In order to strengthen the hinge loop 13 against opening under belt tension, the end of the loop is provided with a tongue 14 which engages against the inner side of the body 10. The loop 11 extends from the upper edge at one end of the body 10 and terminates at the lower edge of the body end, and the loop 12 also extends from the upper edge of the other end of the body and terminates at the lower edge of this end, the loops 11 and 12 having thus been formed by bending downwardly. The hinge loop

13 extends from the lower edge of the body 14 and terminates at the upper edge thereof where its tongue 14 engages against the inner side of the body. My improved process involves the simultaneous bending in opposite directions of the loops in the progressive formation of the links.

Referring to Figures 6 and 7, A indicates the sheet metal stock from which the links are formed, and this stock may be in the form of a steel band. The blank B for the link is cut from this stock, the legs from which the loops 11 and 12 are to be formed being flat and extending in one direction from the body 10, and the leg from which the loop 13 is to be formed being also flat and extending in the opposite direction. With the cutting of the blank from the stock the central portion of the body 10 is offset to one side of the plane of the legs 11 and 12 for the desired distance between the axis of the loops 11 and 12 and the axis of the loop 13 in the finished link. The end of the leg 13 is also deflected to form the tongue 14. With the arrangement as shown in Figures 6 and 7, the center of the body portion 10 is deflected upwardly and the tongue forming end 14 is deflected downwardly so that in the finished blank the tongue will engage the inner side of the deflected body part.

The blank B may be cut entirely out of the stock A and then subjected to progressive die formation in separate die sets, or the blank may be cut from the stock strip entirely except for a small holding section, as for example along the line 15, between the stock strip and the leg 13 close to the base end of the leg, as shown on Figure 6. The stock strip with the blank thus supported thereby along the line 15 may then be passed through a unitary die structure in a manner as explained in my Patent No. 2,232,071, the finished link being then removed from the stock strip by cutting along the line 15. This short holding line or neck 15 will not interfere with the formation into circular form of the legs 11, 12 and 13 of the blank to form the link loops.

On Figures 8 to 15 a number of die sets are more or less diagrammatically shown which may be separate for successively receiving the link blank and embryo link forms, or which may be assembled into a unitary die structure for progressive passage of the links therethrough while supported by a stock band.

Figures 8 to 10 show a die assembly C comprising upper and lower elements movable toward and away from each other in any suitable manner. The link blank B is inserted or fed between these die elements and after the die operation the link has the form as indicated by *c*. As best shown on Figures 9 and 10, the upper element of the die assembly C may comprise two bars 16 and 17 spaced apart at one end by a die member 18 whose width is equal to the axial width of the loop 13 of the link and the axial space between the loops 11 and 12 of the link. The die member 18 is shaped to engage with and form the loop part 13 which is supported by a block 19 resiliently held up in the lower die element by the spring 20. The separated bars of the upper element of the die assembly are shaped at their lower edges to engage with the loop forming legs 11 and 12 of the link to form them against a die block 21 in the lower element of the die assembly. The die blocks 18 and 21 are so formed that when the die elements come together to partially form the loops, the body portion 10 of the links will be substantially in a vertical plane.

On Figures 11 to 14 is shown a die assembly for the next forming operation of the links. This die assembly is indicated by D, and *d* indicates the form of the link by the operation of this die assembly. The upper element of the die assembly has the die element 22 which is substantially semi-cylindrical at its end for cooperation with the concavity 23 in the lower element 24 of the die assembly for forming close to a half upward bend in the loop part 13 of the link. The die bars 25 and 26 of the upper die element are shaped to cooperate with the semi-cylindrical heads 27 and 27' on the lower die element 24 for giving the link loop elements 11 and 12 a substantially half bend downwardly.

On Figure 15, E indicates a die assembly for receiving the link form *d* shown on Figure 11 and bending and deflecting the loops into circular form, while F indicates the die assembly for bringing the tongue 14 intimately against the inner side of the link body and to subject the loops to final pressure to bring the links to their final form. When the link formation after leaving the die assembly D reaches the die assembly E, arbors 28 and 29 are projected between the upper and lower die elements of the assembly E to receive the partially bent loops 11 and 12, and the loop 13, as it comes from the die assembly D is shown in dotted lines and after operation of the die assembly E the link has the form indicated by *e*.

The upper element of the die assembly E comprises die bars 30 and 31 spaced apart by a die tongue 32 depending from one end of the bars. The die tongue 32 has the inner inclined surface 33 leading to an upper substantially semi-circular surface 34. When the upper and lower die elements of the die assembly E come together, the inclined upstanding loop forming part 13 of the link form *d* is engaged by the inclined surface 33 and is swung toward the arbor 29, and when the end of the loop part 13 reaches the semi-circular surface 34 as the two die elements come together, the link part 13 is wrapped around the arbor 29 and its tongue 14 is brought into place behind the link body 10, a spring supported block 35, receiving the bent lower part of the link loop portion 13 in its semi-circular seat 36 so that when the die elements are brought together the loop 13 is formed around the arbor 29.

The die block 35 is between and holds spaced apart two die plates 37 and 38 having V-shaped recesses 40 and 41, respectively, whose bottoms are substantially semi-circular. The die bars 30 and 31 of the upper die element have semi-circular recesses 42 and 43, respectively, therein in alignment with the recesses 40 and 41 in the lower die element. When the upper and lower die elements of the die assembly E are brought together, the depending loop forming legs 11 and 12 of the link form *d* (dotted lines) encounter the outer inclined sides of the recesses 40 and 41 in the die plates 37 and 38 and the loop forming parts 11 and 12 are then swung around the arbor 28, and when their ends reach the inner inclined sides of the recesses 40 and 41 these ends are deflected upwardly to engage around the arbor 28 and the recesses 42 and 43 of the upper die element engage the upper portions of the link form *d* so that as the die elements finally come together the link parts 11 and 12 will be intimately deflected around the arbor 28 to form the loops 11 and 12 of the link form *e*, this link form being almost in its final stage with the exception of the intimate deflection of the

tongue 14 into its final position behind the link body 10.

The deflection of the tongue 14 and final forming of the link is accomplished in the die assembly F in which spaced apart upper die plates 44 and lower spaced apart die plates 45 received between them the loops 11 and 12 for final intimate deflection around the arbor 28, and the upper and lower die plates 46 and 47, respectively, receive the loop 13 and engage the back of the tongue 14 to force it firmly against the back of the link body 10.

In some die operations, particularly where the link is formed progressively through a unitary die structure while the link is supported from a stock strip, it may be more practical and efficient to form the loops 11 and 12 upwardly and the loop 13 downwardly, as shown on Figure 3, instead of forming the loops 11 and 12 downwardly and the loop 13 upwardly as indicated on Figures 1 and 2.

I have thus provided a very practical and efficient method and means for forming metallic cartridge belt links either progressively by separate die assemblies, or by a unitary die structure through which the links are progressively formed while being supported from a stock band, the main feature of the invention being the simultaneous formation of the links in opposite directions with each die operation.

I have shown a practical embodiment of die structures which could be used for the manufacture of the links in accordance with my method, but I do not desire to be limited to the exact structure shown, as changes and modifications may be made without departing from the scope of the invention.

I claim as my invention:

1. The method of forming a metallic cartridge belt link of the type comprising a supporting body with two axially aligned and spaced apart cartridge supporting loops on one side and a hinge loop on the other side in line with the spacing of the cartridge support loops, which consists in subjecting the link blank to successive die operations for progressively forming the link and with each die operation simultaneously forming all the loops with the forming of the cartridge receiving loops in one direction from the body and the hinge loop in the opposite direction.

2. The method of forming a metallic cartridge belt link of the type comprising a body with axially aligned but spaced apart cartridge supporting loops on one side and a hinge loop on the opposite side for engagement between the cartridge supporting loops of an adjacent link, which consists in cutting the flat link blank from sheet metal, then subjecting the blank to successive die operations until the link is completed, with each die operation partially bending the cartridge supporting loop portions of the blank in one direction toward circular form and simultaneously bending the hinge loop supporting portion toward circular form in the opposite direction.

3. The method of forming a metallic cartridge belt link having axially aligned and spaced apart cartridge supporting circular loops on one side and a circular hinge supporting loop on the other side opposite the spacing of the cartridge receiving loops, which consists in passing the sheet metal blank for the link through a series of die assemblies for progressive formation into the finished link, and in each die assembly bending and forming the two cartridge supporting loop portions in one direction toward circular form and simultaneously bending and forming the hinge loop portion in the opposite direction toward circular form.

4. The method of forming a metallic cartridge belt link of the type having a body with axially aligned and spaced apart cartridge supporting loops on one side and a hinge loop on the other side in alignment with the space between the cartridge supporting loops, which consists in cutting the link blank from a band of sheet metal but leaving a neck of metal between the band and blank for support of the blank during formation thereof into the finished link, passing the blank through die structure for successive die operations thereon, and with each die operation bending and forming the cartridge supporting loop portions toward circular form in one direction from the supporting band and simultaneously bending and forming the hinge loop portion toward circular form in the opposite direction from the supporting band, and then cutting the finished link from the band at the supporting neck.

HILDING A. LAYSTROM.