S. D. LOCKE.

CHAIN LINK.

APPLICATION FILED MAY 12, 1908. RENEWED OCT. 2, 1913.

1,107,808. Patented Aug. 18, 1914.

Fig. 1.

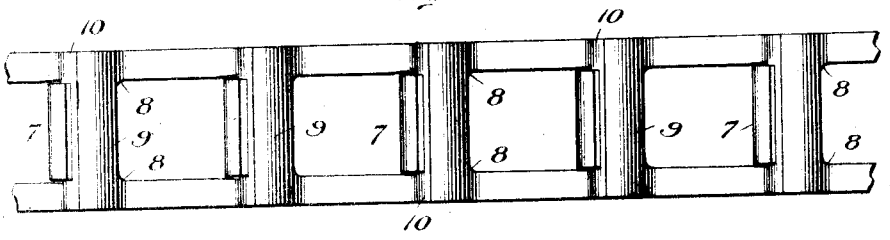


Fig. 2.

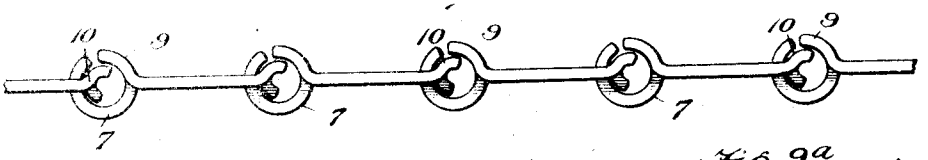


Fig. 3.

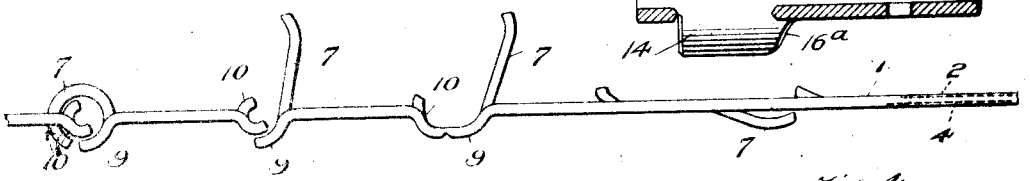


Fig. 9a

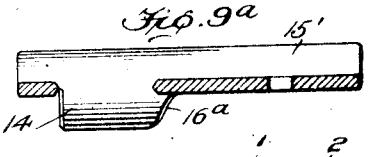


Fig. 8.



Fig. 6.

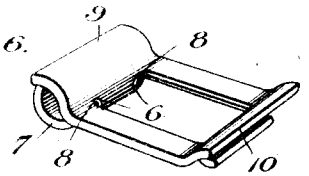


Fig. 4.

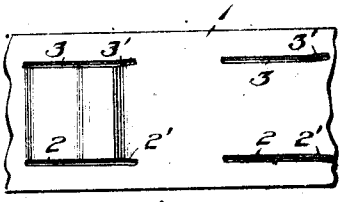


Fig. 9.

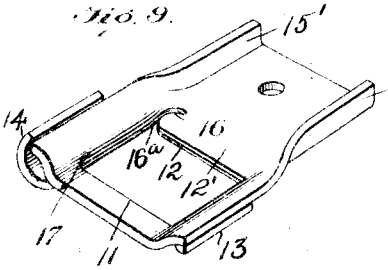


Fig. 7.

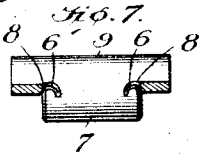


Fig. 5.

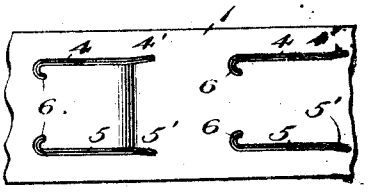


Fig. 10.

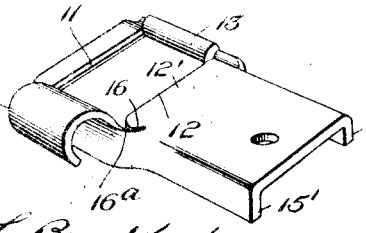
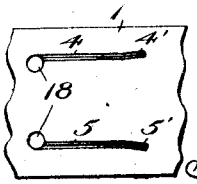


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO LOCKE STEEL BELT COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF NEW YORK.

CHAIN-LINK.

1,107,808. Specification of Letters Patent. Patented Aug. 18, 1914.

Application filed May 12, 1908, Serial No. 432,498. Renewed October 2, 1913. Serial No. 793,068.

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Chain-Links, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in chain links, and more particularly to drive chain links made of sheet metal.

One of the objects of my invention is to so score, punch or drill the metal from which each link, with its side bars and end or cross bars, is formed, as to greatly increase the tensile strength of the link and especially to largely overcome any tendency which may exist for the end or cross bars to tear out along lines continuing from the ends of the longitudinal lines of scoring at the inner edges of the side bars.

Another object of my invention is to so score, punch or drill the metal of which a link is formed as to overcome the tendency of the metal of the end bars to tear out or break away from the metal of the side bars, as the end bars are rolled or bent into the desired shape.

Another object of my invention is to increase both the tensile strength of sheet metal chain links having attachment sections extending from one side bar or both side bars of the link and the strength of the link to resist the breaking away of the said extended side or side bars from the remainder of the link.

Other objects of my invention will be obvious from the drawings and description of chain blanks and chain links and attachments embodying it, chosen herein for the purpose of illustration.

My invention is applicable to any sheet metal chain link in which an end bar of the link is made by rolling up or bending a center section of the metal from which the link is formed.

Figure 1 is a plan view of a section of drive chain embodying my invention. Fig. 2 is an edge view of the same. Fig. 3 illustrates the steps in the formation of each chain link. Fig. 4 is a top plan view of the right hand end of the strip shown in Fig. 3. Fig. 5 is a bottom plan view of the same. Fig. 6 is a perspective view of the formed link, detached. Fig. 7 is a transverse section through the link shown in Fig. 6 and looking toward the large end bar of the link. Fig. 8 is a transverse section of a link having transverse scores at the small end bar ends of the side bars. Fig. 9 is a perspective view looking at the top of an attachment link. Fig. 9ª is a central longitudinal sectional view through an attachment link. Fig. 10 is a perspective view looking at the bottom of the said attachment link. Fig. 11 is a plan view illustrating another way of treating a strip of metal to form a drive chain link.

In Fig. 3 I have illustrated the steps in the formation of a drive chain link from a strip of metal. As the exact nature of the progressive steps in the making of such a link and the forming elements for effecting them constitute no part of my present invention, they are not shown and described, the illustration being chosen simply for the purpose of showing how a well known process for making sheet metal drive chain links may be adapted to the making of links embodying my invention.

Each section of the strip of sheet metal 1 from which a link is to be formed is scored on lines 2 and 3, that is, its surface is cut to a certain depth. The lines of scoring are parallel to each other throughout their length excepting near their rear ends, where they diverge slightly from each other, as indicated at 2′, 3′, respectively. The under surface of each link blank is also preferably scored along lines 4 and 5 corresponding, respectively, to the lines of scoring 2 and 3 on the upper surface of the link blank, and these under surface lines of scoring likewise diverge slightly from each other at their rear ends, as indicated at 4′, 5′. From the front end of each of the lines of scores 4 and 5 a transverse score 6 is made, preferably curvilinear in shape and extending inwardly and rearwardly, as illustrated. When the long narrow lip 7 of the large end bar of each link is rolled up into its final shape of a hook, a fillet is formed at the inner side of the side bar, as indicated at 8, between the side bar and the wide upturned lip 9 of the large end bar of the link.

It is generally understood that, in rolled or drawn metal, such as is employed in the making of sheet metal drive chain links, fibers of the metal arrange themselves longitudinally of the strip of metal, or parallel to the direction in which the metal passes through the rolls or is drawn. It is believed that this fibrous nature of the metal is, to a certain extent, responsible for the tendency of the metal of which the end bars of the links are formed, to crack or tear from points at the ends of the lines of scoring for the side bars in all the earlier known forms of sheet metal drive chain links. At any rate, and for example, in many sheet metal links of the general construction shown in Letters Patent of the United States, No. 633,371 to G. Skogse, patented September 19th, 1899, after the metal of the end bars is bent or curved into final shape, cracks in the metal are noticeable leading from the ends of the lines of scoring. Where this is the case, and the link is subjected to a tensile strain, the end bars are liable to tear out or shear commencing at the said cracks. By scoring the metal of the link transversely from the ends of the longitudinal lines of score for the side bars, which latter scores extend substantially in the lines of arrangement of the fibers of the metal, I overcome the tendency of the metal of the end bars to crack or tear along the line of fibers at the ends of the side bar scoring, as it is bent or curved into shape. At the same time, by said transverse scoring, the fibers of the metal are so disarranged at the end of the longitudinal scoring and immediately in line therewith, that no sharp corner exists between the metal of the end bar and the metal of the side bar and a fillet 8 is formed to strengthen the link at this point. In fact, the corners between the end and the side bars of my improved link are built up or filled in instead of being sharply defined substantially right angle corners, as has been the case with all earlier sheet metal drive chain links of which I am aware. When a tensile strain is applied to one of my improved links, no sharply defined corners exist between the end bars and the side bars where the transverse scoring is done, and from which the end bar will readily tear out. This transverse scoring of the metal at the ends of the longitudinal lines of score, furthermore, substantially overcomes the tendency of the metal of the end bars to crack or tear away from the side bars under the bending or curling up operations incident to the final shaping of the end bars, as well as the tendency of the metal to shear or tear along the lines of scoring which are substantially in line with or parallel to the line of application of strain on the link.

In most instances I have found it unnecessary to transversely score the metal at both ends of the longitudinal lines of score, it sufficing to do so only at the large end bar or sprocket bar end of the link, as illustrated in Fig. 5. The metal for the larger end bar or end hook is subjected to severer forming and bending strains than is the metal of the smaller end bar or pintle, and there is more tendency for the larger end bar or end hook to tear out than for the smaller one, when the formed link is subjected to tensile strain.

Although, owing to its shape and size, the small end bar of each link is subjected to less tearing or shearing strain than the large end bar, nevertheless, in some instances it may be advisable to transversely score the metal at the rear ends of the lines of score for the side bars to overcome the tendency of the metal to shear out on longitudinal lines from these points and to form a fillet or built up corner between the inner edge of a side bar and a small end bar. In Fig. 8 I have shown such transverse scoring of the small end bar of the link.

The divergence at the rear end of each link of the lines of scoring for the side bars, tends to increase the distance between the side bars of the link adjacent to the small end bar in order to provide sufficient clearance for facilitating the formation of the long narrow lip 7 of the large end bar for the next succeeding link about the small end bar or pintle 10. Heretofore, so far as I am aware, this necessary clearance between the side bars at the small end bar of the link has been obtained by scoring the link blank on lines which diverge from each other throughout their entire length, as illustrated in the said Skogse patent hereinbefore referred to. Where the lines of score for the side bars thus taper throughout their entire length, the sprocket opening through the link is of uneven dimensions and the side bars of the link do not run uniformly relative to the sprocket wheel. Furthermore, where a relatively narrow side bar is required to begin with, the said taper scoring tends to weaken the side bar more than is advisable. Again, where a chain having its links thus taper scored is used on a horizontal drive over small sprocket wheels and the lower run of the chain is active, the upper run may sag sufficiently to engage with the links of the lower run and have one of the narrow lips of the large end bar of a link on the upper run enter the opening of and become wedged in one of the links of the lower run with resultant damage and stoppage of the machine. I have found that the only place where clearance for the narrow lip of the large end bar is required, is immediately adjacent to the small end bar of the link with which the said narrow lip is coupled, consequently the slightly diverging scoring adjacent to the small end bar of one of my improved links, accomplishes all of the desired

results and obviates the difficulties and disadvantages of the earlier taper scoring for the side bars.

Occasions arise when it is desirable to have links with so-called attachments for connection with elements of a conveyer, or for similar purposes. In Figs. 9 and 10 I have shown a link with an extended side bar to facilitate the attachment of a conveyer element. This link is formed from a piece of sheet metal by scoring the metal on longitudinal lines 11 and 12, similar to the scoring of the links hereinbefore described, bending and shaping one portion of the central section between the lines of scores to form an end bar or pintle 13, and the other portion of the said central section to form the large end bar or sprocket bar 14. The ends of the metal blank adjacent to and at one side of the side bar 12′, are bent up as indicated at 15′, 15ª, to receive between them the conveyer element to be connected to the link. At 16 the metal of the blank is scored transversely to the line of score 12. The metal of the blank at the opposite end of the line of score 12, may be likewise transversely scored, if desired, and transverse scoring may be done at the opposite ends of the line of score 11. I have indicated a transverse score at 17, at the front end of the line 11.

When the large end bar of the link with the laterally extending attachment section is formed, the grain of the metal or fibers is severed at the front end of the line of scoring 12, and a fillet 16ª is formed between the metal of the side bar 12′ and the metal of the large end bar 14. When tension is applied to the link there will not exist a pronounced tendency for the large end bar to tear out or shear along the longitudinal line of score 12, extended, as the fibers of metal along this line have been severed. The fillet 16ª strengthens the joint between the large end bar and the side bar 12′ and directs the said tensile strain on the link to the metal in the lateral extension of the side bar 12′. Owing to the formation of the fillet 16ª and the severing of the fibers at the end of the line of score 12, the link is also greatly increased in strength to resist the breaking of the side bar 12′ and its lateral extension from the rest of the link. The fillet 16ª substantially forms a vertical brace between the large end bar 14 and the extended side bar 12′, and in order to break the said bar from the rest of the link, such breaking must be done against the said bracing effort of the fillet and through metal which is not weakened along the line of its grain or fiber.

I have demonstrated by actual test that the transverse scoring of the metal blank at 16 not only greatly increases the tensile strength of the combined link and side bar extension, but also greatly increases the resistance of the metal to the bending of the side bar extension relative to the rest of the link and to the breaking or tearing of it therefrom.

In practice I have found it desirable to make the scores at the ends of the lines of score for the side bars, and which are hereinbefore referred to as transverse scores, curvilinear in shape and to carry them around until their ends are pointed in a direction substantially parallel to the longitudinal lines of scores or the fibers of the metal. However, these transverse scores may be shaped in any suitable manner and may be of any length and size suitable to effect the spirit of my invention.

While hereinbefore I have referred entirely to transverse scoring or equivalent scoring as a means for overcoming the tendency of the end bars of the link to tear out from points at the ends of the lines of scoring for the side bars and for increasing the breaking strength of the links with lateral extensions, it will be understood that the same results may be obtained by punching out or drilling the link blanks at the ends of the longitudinal lines of score for the side bars. This I have illustrated in Fig. 11, wherein 18 indicate drilled or punched out openings through the link at the ends of the lines of score for the side bars. It will be readily understood that this punching and drilling accomplishes substantially the same purposes hereinbefore set forth in detail, which result from the transverse scoring, or equivalent scoring at the ends of the longitudinal lines of score, namely, the diversion of the cracking of the metal at the ends of the longitudinal lines of score, and the building up of the corners of or the forming of fillets between the end bars and the side bars.

Many alterations in the construction and many apparently widely differing embodiments and applications of my invention will suggest themselves to those skilled in the art of making sheet metal chain links, without departing from the scope and spirit thereof.

My disclosures and description herein are purely illustrative, and are not intended to be in any sense limiting

What I claim is—

1. A drive chain link formed from a blank of sheet metal and having side bars, a relatively small end bar and a relatively large end bar or end hook, said hook being struck from metal of the strip between said side bars, and fillets in the corners between the inner edges of said side bars and said end hook.

2. A drive chain link formed from a blank of sheet metal and having side bars, a relatively small end bar and a relatively large end bar or end hook, said hook being struck

from metal of the blank between said side bars, and transverse scores leading from the ends of the inner edges of the side bars at their corners with the metal forming said end hook, respectively.

3. A drive chain link formed from a blank of sheet metal and having side bars, a relatively small end bar and a relatively large end bar or end hook, said hook being struck from metal of the strip between said side bars, and transverse scores in the metal of said end hook extending from the ends of the inner edges of said side bars.

4. A drive chain link formed from a blank of sheet metal and having side bars, a relatively small end bar and a relatively large end bar or end hook, said hook being struck from metal of the blank between said side bars, and the fibers of the metal of the blank transversely severed between the inner edges of said side bars and said end hook.

5. A drive chain link formed from a blank of sheet metal scored longitudinally to form side bars, and having a sprocket bar with a hook struck from metal between said longitudinal lines of score, and transverse scores leading from the ends of said longitudinal lines of score.

6. A drive chain link formed from a blank of sheet metal scored longitudinally to form side bars, and having a sprocket bar with a hook struck from metal between said longitudinal lines of score, and the fibers of the metal of the blank transversely scored from the ends of said longitudinal lines of score.

7. A drive chain link formed from a blank of sheet metal scored longitudinally to form side bars, one of which is laterally extended, and having a sprocket bar with an end hook struck from metal between said longitudinal lines of score, and a transverse score extending from the corner of the inner edge of said laterally extended side bar and said end hook.

8. A drive chain link formed from a blank of sheet metal scored longitudinally to form side bars, one of which is laterally extended, and having an end bar struck from metal between said longitudinal lines of score, and a transverse score extending into said laterally extended side bar from the corner between its inner edge and said end bar.

9. A drive chain link formed from a blank of sheet metal scored longitudinally to form side bars, one of which is laterally extended, and having an end bar with a hook struck from metal between said longitudinal lines of score, and having the fibers of metal transversely severed between said end bar and the inner edge of said laterally extended side bar.

10. A drive chain link formed from a blank of sheet metal longitudinally scored to form side bars and having a pintle partially formed from metal of the blank between said lines of score and a sprocket bar with an end hook formed from metal between said lines of score, and transverse scores leading from the ends of said longitudinal lines of score.

11. A drive chain link formed from a blank of sheet metal and having side bars and an end bar having an end hook struck from metal of the blank between said side bars, there being between one of said side bars and said end hook a fillet or built up corner formed from metal of said blank between said side bars.

12. A drive chain link formed from a blank of sheet metal and having side bars, and an end bar having an end hook struck from metal of the blank between said side bars, one of said side bars being laterally extended and there being between said end hook and laterally extended side bar a vertical brace formed from metal of said blank between said side bars.

13. A drive chain link formed from a blank of sheet metal scored on parallel lines to form side bars, the lines of score near one end of said blank only being extended on diverging lines, and having an end bar struck from the metal between said lines of score including that between said diverging lines.

14. A drive chain link formed from a blank of sheet metal scored on parallel lines to form side bars, the lines of score near one end of said blank only being extended on diverging lines, and having a relatively small end bar struck from the metal between said lines of score including that between said diverging lines, and the said parallel lines of score near the other end of said blank being extended transversely to the inner edges of said side bars and having a relatively large end bar struck from the metal between said lines of score including that between said transverse lines.

In testimony whereof I affix my signature, in the presence of two witnesses.

SYLVANUS D. LOCKE.

Witnesses:
E. S. BANKS,
WM. A. REDDEN.