(No Model.)

J. M. DODGE.

DRIVE CHAIN.

No. 393,220. Patented Nov. 20, 1888.

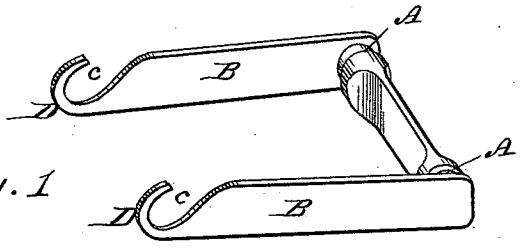


Fig. 1

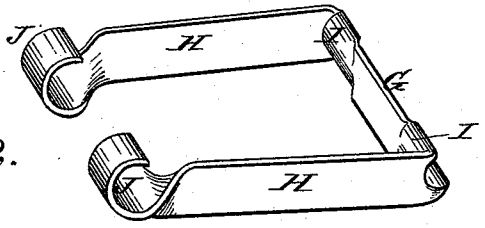
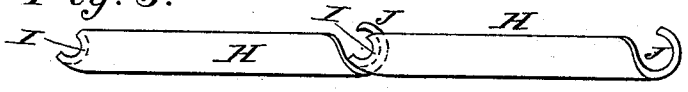


Fig. 2.

Fig. 3.



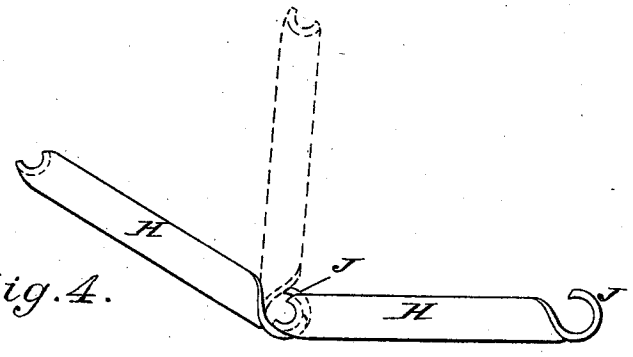


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

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DRIVE-CHAIN.

SPECIFICATION forming part of Letters Patent No. 393,220, dated November 20, 1888.

Application filed August 14, 1888. Serial No. 282,707. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. DODGE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Conveyer-Chains; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that species of conveyer-chain which is composed of a series of similarly-constructed U-shaped links—*i. e.*, a series of units, each of which in contour represents three sides of (either a square or an oblong) rectangular parallelogram.

Heretofore the best form of this species of conveyer-chain has been made with each of the two side bars of each link in the form of a thin flat bar arranged vertically (relatively to the conveyer trough or floor) and having its free end shaped to form a coupler-hook, the bearing-surface of which was no thicker than the thickness of such flat bar, and with lateral nearly cylindrical swells or projections on both sides of the end bar (which was, like each side bar, composed of a thin flat bar) near each of its ends forming pintle-like devices with which the coupler-hooks of the side bars engaged; but in the manufacture and use of such conveyer-chain there are serious mechanical and commercial defects and difficulties. In the first place, the coupling devices being composed of the pintle-like enlarged portions of the end bar and hooks on the ends of the side bars that have throat-openings equal in size to the diameters of the said pintle-like parts, the links are liable to casual separation whenever there may be considerable slack in the chain, and, furthermore, the extent of the bearing-surface between hook and pintle being restricted to the thickness merely of the (necessarily) thin flat side bar, it follows that the bearing-surfaces at the articulations of the chain very soon wear out. In the next place, (as the cost of all castings increases in a rapid ratio in proportion to the size or bulk of the mold in proportion to the actual amount of stock embodied in the molded article,) this form of conveyer-chain cannot be manufactured of malleable castings in the larger sizes of chain except at a greatly-increased cost, while at the same time the expense of making would be increased perhaps in a still greater degree were it attempted to forge the links out of ordinary flat bar-iron, on account of the costly and difficult operation necessary to either weld in seperate pieces or sufficiently upset or swage up the metal to form the pintle-like or solid cylindrical portions of the end bars.

I propose to provide for use an efficient and durable conveyer-chain of the species alluded to, which shall be detachable only when the parts are turned out of the working position or relationship, and which can be made at a comparatively small cost in all the larger sizes or numbers of chain; and to these main ends and objects my invention may be said to consist in a conveyer-chain, each of the links of which is made of a piece of flat bar-iron bent into a sort of U shape and having nearly or quite semi-cylindrical interiorly-arranged swells struck up in the end bar near its ends, and having coupler-hooks formed at the ends of the side bars by twisting and bending the stock, so that the bearing-surface of each hook is coextensive with the size of the bar-iron widthwise of said bar, all as will be hereinafter more fully explained; and my invention furthermore consists in a conveyer-chain of the species mentioned, in which the male members of the articulations are composed of nearly or quite semi-cylindrical devices located near the ends of the end bars and in which the coupler-hooks have throat-openings sufficiently small to prevent the passage through them of said semi-cylindrical devices except when the links are turned relatively out of a working position, all as will be hereinafter more fully set forth.

To enable those skilled in the art to which my invention relates to make and use conveyer-chains embracing my improvements, I will now proceed to more fully describe the latter, referring by letters to the accompanying drawings, which form part of this specification, and in which I have shown my invention carried out in that precise form of reduction to practice in which I have so far successfully used it.

In the drawings I have illustrated at Figure 1 by a perspective view the species or type of conveyer-chain to which my invention relates made in the form or according to the plan of construction which I hereinbefore alluded to and the best form heretofore known and used. At Fig. 2 I have shown in perspective a link made according to my invention. Fig. 3 is an edge view of two such links coupled together and in a working position. Fig. 4 is an edge view of the same links, but turned out of a working position, and also showing by dotted lines the further relative movement of the links necessary to permit their detachment or uncoupling.

In all of the last-mentioned three figures the same parts will be found designated by the same letter of reference.

Before describing these figures I will, however, refer briefly to Fig. 1 to merely explain that in the older and best heretofore known construction of chain of that type to which my invention relates, there shown, the pintle-like devices A of the end bars, B, are free, it will be seen, to back out of the throat-openings *c* of the coupler-hooks D, so that the parts of the chain are liable to casual separation whenever the chain may be very slack, (as is often the case in the use of conveyer-chains,) and, furthermore, that in this form of the chain the bearing-surfaces between the male and female members of the articulation, it will be seen, are only coequal with the thickness of the bar of which the hooks D are composed, and that therefore these bearing-surfaces soon cut and wear out to an extent sufficient to weaken the structure.

At Figs. 2, 3, and 4, G are the end bars, and H the side bars, of my improved construction. I are the male members of the articulations, each of which members is formed, as shown, of a semi-cylindrical upset of one of the end portions of one of the flat end bars, G, and J are the hooks or female members of said articulations, each of which is formed, as shown, by first twisting the end portion of one of the side bars, so as to bring the flat bar-iron into a transverse position relatively to the main portion of the side bar, and then bending the end of the bar in the direction of its thickness, so as to form a hook of the proper size and shape to embrace the male member I of the joint.

As will be seen, the contour of each of the hooks J is such in side view or profile (see Fig. 3) that the space between one end of the lip of the hook and the upper downwardly-curved edge of the main portion of the side bar is insufficient to permit the passage through said space of one of the male members I (in either coupling or uncoupling any two adjacent links) except when such male member I shall have been turned into the relative position indicated in dotted lines at Fig. 4, and thus, it will be understood, my improved construction of conveyer-chain is made to embrace that principle or mode of operation which is peculiar to what is known in the art of drive and conveyer chains as a "detachable" chain.

In the process or method of making my improved chain I have found it expedient or desirable to proceed in the following manner, viz: I take a piece of the common flat bar-iron of commerce of sufficient length to make the U-shaped link of the desired width and length, and having first predetermined the proportions of the link—that is, the length relatively to its width—I first, at the proper localities near the middle portion of the bar, subject the metal, after having properly heated it, to a swaging or upsetting operation between suitable dies, which operate to bend or swage the metal at the two requisite points and to the proper extent lengthwise of the bar to produce the semi-cylindrical or half-round swells which are to subsequently constitute the male members I of the link. I then subject each of the ends of the bars in a sufficiently-heated condition to the action of suitable twisting and bending mechanisms, (such as commonly known in the arts,) so as to first twist the stock to bring a certain extent of each end of the bar into a plane transverse to that in which the rest of the bar lies and about coincident with one of the edges of said bar, after which the transversely arranged or twisted end portions are simply bent into the necessary hook shape to complete the ends of the link. I then, while properly heated, subject the bar to a simple bending operation, bending it at the proper points and at right angles with itself to form the two side bars, H, turned transversely, or nearly so, to the end bar portion, (marked G,) which completes the formation of the link.

By this simple mode of manufacture and by the use of the common flat bar-iron of commerce I am thus enabled to produce the U-shaped links in duplicate to form a conveyer-chain of any desired length, which, while its side bars and end bars are of equal height, so as to perform all the necessary functions of a carrier-chain, and so as to operate at the vicinity of its end bars in a most efficient and desirable manner, the cost of the production of the chain is very little as compared with the cost of chains of this species or type as heretofore made, which did not possess all the advantages of my improved construction.

It will be seen that by the formation of the hooks by first bending the stock transversely and then turning it into the female members J an articulate joint is made which possesses the maximum amount of utility by reason of embracing the greatest possible bearing and wearing surface which can be produced with the size of bar used to make any predetermined size of link; while at the same time the particular form of the hooks J, in the manner shown and described, and the making of the male members I semi-cylindrical, as shown,

enables me to produce the chain with what is technically known as a "detachable" coupling device or articulation.

Having now so fully explained the general construction and mode of operation of my improved conveyer-chain, and wishing it to be understood, of course, that many variations as to precise size and proportions of the parts may be made without changing the principle of construction or materially altering the mode of operation of the structure shown, what I claim as new, and desire to secure by Letters Patent, is—

1. A conveyer-chain comprising a series of U-shaped links, each of which is formed of flat bar-iron and has its end bar made with semicircular or curved male articulate members I, and the free ends of its side bars with hooks or female articulate members J, all substantially in the manner and for the purposes hereinbefore set forth.

2. A conveyer-chain comprising duplicate links, each one of which has formed on the end bar male members I, produced by the upsetting of the flat bar at proper localities, and has the free ends of its side bars made with coupler-hooks J, the throat-openings of which are of such size relatively to the male members I of the link that any two adjacent links can be coupled and uncoupled only when the links are turned out of a working position, substantially as hereinbefore set forth.

In witness whereof I have hereunto set my hand this 1st day of August, 1888.

JAMES M. DODGE.

In presence of—

THOS. M. RICHARDS, Jr.,

E. R. LOWEREE.