W. B. CONWAY & W. A. HEALD.

Machine for Bending Chain-Links.

No. 208,515. **Patented Oct. 1, 1878.**

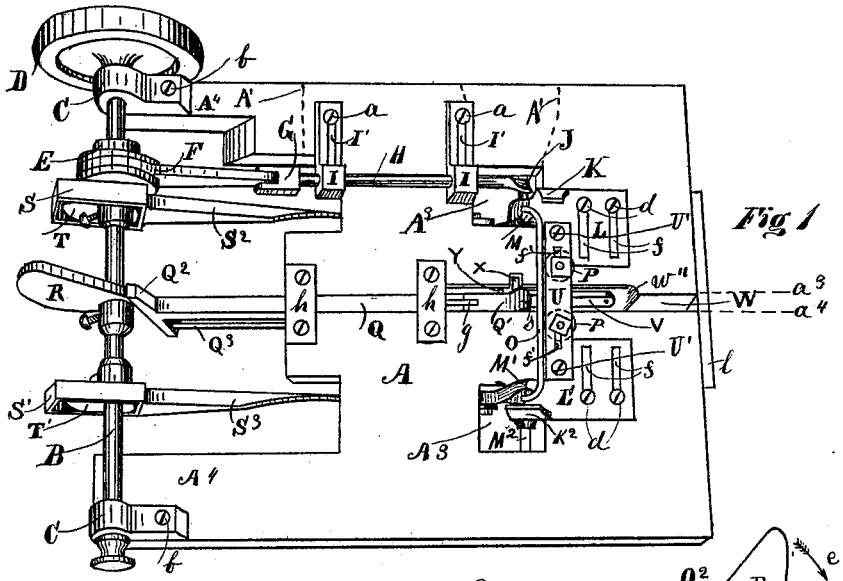

Fig 1

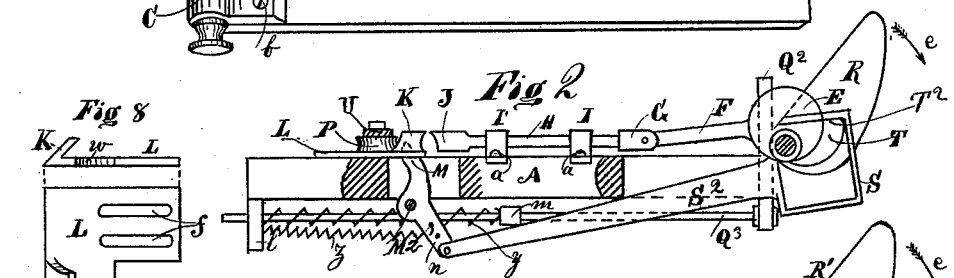

Fig 2

Fig 8

Fig 3

Fig 9

Fig 4

Fig 5

Fig 6

Fig 7

WITNESSES:

S. C. Fink

A. A. Moore

INVENTORS.

William B. Conway.

Wallace A. Heald.

Per E. C. Fink.

their Attorney

UNITED STATES PATENT OFFICE.

WILLIAM B. CONWAY AND WALLACE A. HEALD, OF INDIANAPOLIS, IND.

IMPROVEMENT IN MACHINES FOR BENDING CHAIN-LINKS.

Specification forming part of Letters Patent No. **208,515**, dated October 1, 1878; application filed December 31, 1877.

To all whom it may concern:

Be it known that we, WILLIAM B. CONWAY and WALLACE A. HEALD, of Indianapolis, county of Marion, and State of Indiana, have invented a new and useful Machine for Manufacturing Links for Chains, &c., which is fully set forth and described in the following specification, and illustrated in the accompanying drawing.

The invention relates, principally, to the new construction and arrangement of devices and in the new combination of elements in a link-machine, whereby links of all sizes may be easily and rapidly made, especially in bar-iron-rolling mills, where the bar-iron when finished by the rolls can be immediately run through the machine and converted into links, ready for welding, without the necessity of reheating the bar.

The object of the invention is to furnish a machine with devices of peculiar construction and arrangement that will facilitate the manufacture of chain-links, &c.

The invention consists in the new construction and arrangement of particular parts, and in the new combination of elements, in a link-manufacturing machine, which are deemed essential to produce certain results, all of which will hereinafter be fully explained.

In the drawing, in which like letters of reference in the different figures indicate like parts, Figure 1 represents a perspective plan view of the machine embodying our improvements, and shows the general arrangement of all parts above the table. Figs. 2, 3, 4, and 5 are sectional elevations. Fig. 6 represents the link, as formed complete, ready for welding, by the machine. Fig. 7 represents the link-blank as cut by the machine preparatory to bending. Fig. 8 shows an edge and plan view of the adjustable shears and end former-block of the link; and Fig. 9 is an edge and plan view of the other adjustable former-block, with gage attached.

With main reference to Fig. 1, A represents the table or bed of the machine, mounted on legs, and provided with two openings, A^3 A^3, and with arms or bracket-shaft supports A^4 A^4, and a central groove, W. The brackets A^4 A^4 project backward and form supports for the shaft B, which is mounted in suitable boxes C C. On said shaft are secured the large central cam, R, the small cams, T T′, the eccentric E, and driving-wheel D. The cams T T′ are of the construction shown—*i. e.*, flat on one edge and curved on the other—and they, together with the eccentric E, are adjustable on the shaft, and may be secured thereto by set-screws or keys, or with set-screws and a feather, which is preferred as the best means of preventing the cams and eccentric from slipping out of adjustment.

In the groove W of the bed-plate or table A the driver Q operates, and is held in position by the caps or slide-boxes *h h*. The driver Q is of peculiar construction. The main part Q is, by preference, made square, and is provided at the rear end with a T-head, Q^2, which extends above and below the driver Q, and forms an abutment for the cam R to operate against and force the driver forward as the cam is revolved. In order to insure the quick return of the driver (after the cam has forced it forward, and in its revolution has presented the straight part R′ to the T-head Q^2) and always keep it in contact with the cam R, various methods may be employed, and we show one of the simplest—that of a spring, *y*, Figs. 2 and 3, which operates on a rod, Q^3. The rear end of said rod is secured to the lower arm of the T-head Q^2, and the front end passes through a bracket, *l*, at the front of the machine. The spring *y* at one end abuts against the bracket *l*, and at the other end against a set-collar, *m*, which can be adjusted to regulate the tension of the coiled spring. It is obvious that a pulley, cord, and weight could be used in place of the spring; or a pull-spring may be attached and produce the same result.

The front end or head, Q^1, of the driver Q is hinged at *g* in such a manner as to prevent the body from rising above the level of the table, but so as to allow the projecting end *s* to fall below the top surface of the table in its backward movement, as shown in Fig. 4, and by means of mechanism hereinafter described the said projecting end is made to rise and travel forward above the top of the table, as shown in Fig. 3. In a recess, *w″*, formed in the side of the groove W, (reference

being had principally to Figs. 1 and 5,) is a lever, V, which is pivoted at r to the side wall of the recess, as shown. This lever is provided with a bent wire, k, which is attached to the downward-projecting lug k^1, and extends sidewise into the notch x, and then turns downward, and is provided with a weight, k^2, below, as a means of pulling the lever down after it has been raised by the pin Y of the driver-head Q^1 in its backward motion. The lug k^1 is designed to support and hold the lever V level on top. When the lug rests on the bottom of the groove W the operations of these last-described parts are as follows: The pin Y, which is inserted in the side of the hinged head Q^1, as the head moves forward, travels on the top of the lever V, and holds the projection s above the table until it falls off the pivoted end r, when the head Q^1 tips down far enough to allow the projection s to be below the top surface of the table, as shown in Fig. 4. As the driver moves backward by the action of the spring y, the pin Y passes under the lever V until it reaches the lug k^1, and then raises the lever enough to allow the pin Y to pass under it. At the same time the curved part r' at the rear and bottom of the hinged head Q^1 comes in contact with the lifting-plate r, and raises the head Q^1 to a horizontal position just as the pin Y passes the end of the lever V, and just as the driver Q has reached its limit of stroke backward, when the rear end of the lever V falls down, the lug k^1 resting on the bottom of the groove W, with its upper side level, to allow the pin Y to again travel over the top and repeat the operation. The purpose for which this peculiar operation is designed will hereinafter be fully described.

On the upper surface of the table A, and extending across the groove W in front of the openings A^3 A^3, is located a bar, U, which is secured to the table by bolts U' U'. Said bar is elevated above the table far enough to allow the sheaves P P to operate between it and the table, and is provided with slots f' f', in which the sheaves P may be adjusted sidewise. The adjustable former-block L is of peculiar form. It has a shape similar to that shown in Fig. 8, and is provided with slots f, (or the slots may be formed in the table A,) so that a means of adjustment sidewise may be obtained. The curved former w is formed in the manner substantially as shown on the plate L; but various sizes of detachable segments with curved edges may be attached to the plate to form the ends of link-blanks of different sizes.

On the plate L is secured the cutter K, which is inclined at an angle of about forty-five degrees, and is designed to operate in conjunction with the cutter J, that is secured to the rod or shaft H, the said shaft being reciprocated in the boxes I I by the eccentric E and strap-rod F, in such a manner as to cause the cutter to cut off from the rod O a blank of the required length, with beveled ends p p, properly formed to make a lap-weld, as shown in Fig. 7. The other former-block, L', is of similar construction to that of L, except that instead of being provided with a cutter it is provided with an inclined gage-plate, K^2, and an inclined support, K^3, for the beveled end p of the blank to rest on and prevent the blank from turning around after it has been cut off. This is one of the important features, as it prevents the cut blank from rolling out of position and allowing the beveled parts p to be turned the wrong way for welding when the blank is forced through the sheaves, which, in the absence of such a device, or some other for the same purpose, would be liable to occur.

Attached to the under side of the table is a shaft, M^2, supported in suitable hanger-boxes; and on said shaft is secured, in an adjustable manner, the levers M M^1, which are connected by bolts at their lower ends to the cam-strap rods S^2 S^3, these rods being also secured to the square straps S S^1, that are operated by the cams T T' on the shaft B. The upper ends of the levers M M^1 are curved, and their extreme upper ends on the outside are rounded to conform with the curved parts w w' of the former-blocks L L'. The springs z are attached to the lower arms of the levers, and to some suitable bracket, as l, and act as draw-springs to pull the lower ends of the levers and the straps S S^1 forward.

In adjusting the machine, the former-blocks L L' are moved sidewise the proper distance to receive the blank cut from rod O, of the proper length to form the required size of link. The sheaves P are also adjusted to give the required width of link. The proper size segments, if any are required, are attached to the former-blocks L L', to form the curves w w' for the ends of the link-blank, and an additional width of the projection s on the driver-head Q^1 may be added, if required. The cutter J may be adjusted to cut the blank from the rod O by moving the eccentric E and guide-boxes I I; and the arms or levers M M^1 must be adjusted, together with their cams T T', so as to allow the upper ends of the levers to operate against the blank, and bend the ends of the link that are to be welded between them and the formers w w' of the blocks L L', as shown in Fig. 1.

It will be seen from the foregoing that when the machine is adjusted and in operation, the rod O is inserted (hot) between the cutters K and J, and a small piece is cut off, to give the bevel p at the end. During the backward motion of the cutter J the rod O is pushed through until the beveled end p strikes the gage-plate K^2, and rests on the beveled support K^3. The cutter J, on its return stroke, cuts from the rod the proper length for the link, as shown in Fig. 7, and at the same time the cams T T' move the levers M M^1, and bring their upper ends against the severed portion of the rod, bending the ends thereof against the formers w w', as shown in Fig. 1. The cams T T', after forcing the levers M M^1 against the ends of the blank cut from the rod, rotate far enough

to present their flat edges to the rear sides of the straps, thereby releasing the said straps, and allowing the springs *z* to pull them back and bring the upper ends of the levers M M^1 below the upper surface of the table, out of the way of the blank while it is being bent. At the same time the large cam R forces the driver Q forward. The projecting end *s* of the hinged head Q^1 comes in contact with the blank severed from the rod O, and forces it through between the sheaves P P, the curved beveled ends of the blank sweeping around suddenly as the same is forced through the sheaves, forming the link, as shown in Fig. 6. The link may then be removed from the head Q^1, and the pin Y, being in front of the lever V, allows the head Q^1 to drop. The pin Y passes under the lever V in its back stroke, allowing the projecting portion *s* to pass under the next blank that has been cut while the first blank is being carried through the sheaves; and when the head Q^1 is at its extreme back stroke the lifting-plate *r* raises the head so that the projection *s* is above the table, ready to engage with the next blank in its forward stroke.

It is obvious that the cam R may be discarded and an eccentric or crank employed instead thereof, and that there may be various other devices employed to operate the hinged head Q^1, and allow it to pass under the cut blank in its back stroke, and raise the said head so as to engage with the blank in its forward stroke; and other modifications or equivalent devices may be used, whereby links with beveled welding ends can be formed at one operation, similar to that of our machine, without departing from the essence of our invention; and the levers M M^1 may have but one upper arm each to bend the ends of the link, and an independent lever-arm may be secured to the shaft M^2, that can be made to operate both levers by one cam, T; or a cam, T, may be made to operate straight rods with curved ends to bend the ends of the links, and in moving back work down inclined planes formed in the table, so as to allow the ends of the blank to pass over them while sweeping around and passing through the sheaves.

What we claim as new, and desire to secure by Letters Patent, is—

1. The table A, with groove W and lifting-plate *r*, in combination with the hinged head Q^1 of the driver Q, in the manner and for the purpose substantially as shown and described.

2. The lever V, with a bent wire, *k*, and weight or spring k^2, in combination with the hinged head Q^1, having pin Y, and lifting-plate *r*, in the manner and for the purpose substantially as shown and described.

3. The adjustable plate L, with curved former *w*, in combination with the cutter, driver, sheaves, and bending-lever M, as set forth.

4. The adjustable plate L, with cutter K and curved former *w*, and the adjustable plate L′, with gage K^2 and angle-plate rest K^3, in combination with the adjustable movable cutter J and bending-levers M M^1, in the manner and for the purpose substantially as shown and described.

5. The adjustable plates L L′, with curved formers *w w′*, in combination with the sheaves P P, the bending-levers M M^1, and the driver Q, with hinged head Q^1, by means of which the ends of a blank are first bent, and then the blank is forced through the space between the sheaves and the link formed, in the manner and for the purpose substantially as shown and described.

6. The shaft M^2, with bending-levers M M^1, in combination with straps S S^1, the cams T T′, and the curved adjustable formers *w w′*, in the manner and for the purpose substantially as shown and described.

7. The driver-head Q^1 and pin *y*, combined with the lever V and plate *r*, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM B. CONWAY.
WALLACE A. HEALD.

Witnesses:
E. O. FRINK,
ERASTUS T. BUSSELL.