July 29, 1947. A. H. BRANNOCK 2,424,917

BENDING MACHINE FOR RECLAIMING DEFORMED MACHINE GUN BELT LINKS

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Fig. 1.

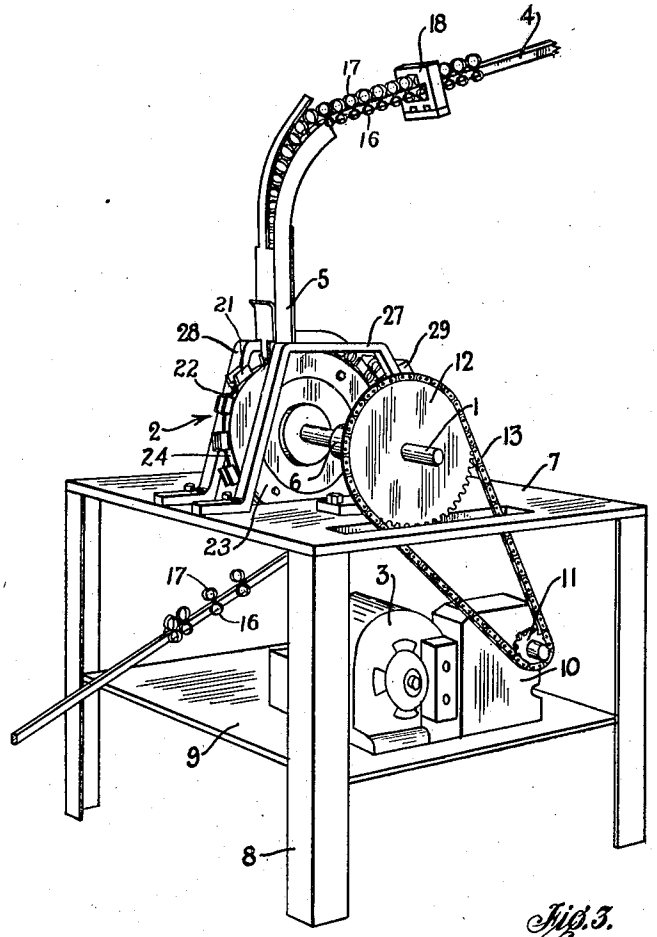


Fig. 2.

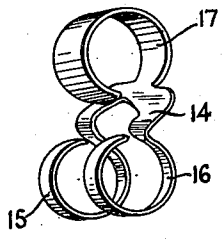
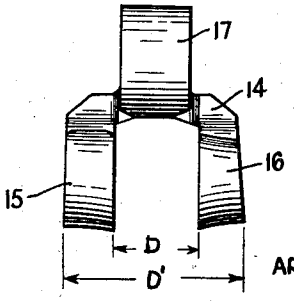


Fig. 3.



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Fig. 4.

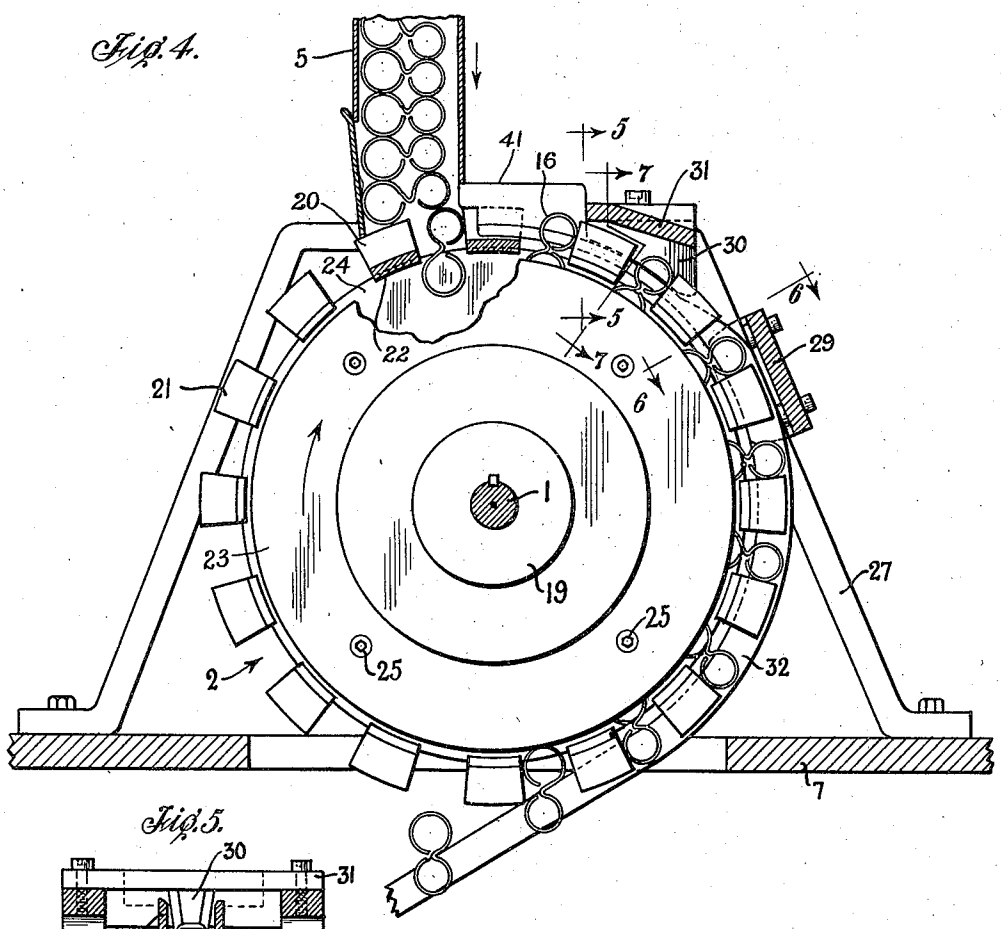
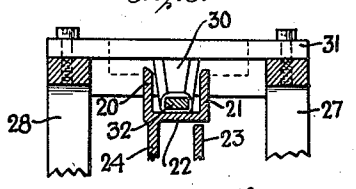


Fig. 5.



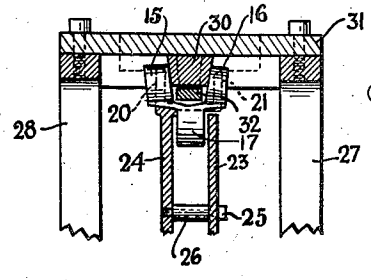
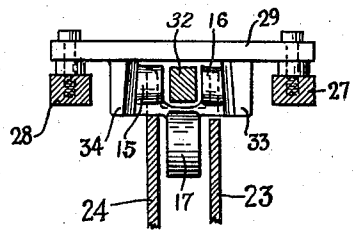


Fig. 7.

Fig. 6.



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BENDING MACHINE FOR RECLAIMING DEFORMED MACHINE GUN BELT LINKS

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Application September 2, 1943, Serial No. 501,033

3 Claims. (Cl. 153—32)

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This case concerns an invention in a machine for reclaiming links for machine gun cartridge belts and, more specifically, is adapted to bring certain dimensions of the links which vary too greatly from a standard into conformity with that standard. The machine is so constructed as to receive links which do not conform to standard dimensions, automatically pass those links through a die or dies which are adapted to bring the links approximately to the requisite dimensions and then eject the reclaimed links.

Machine gun belt links are produced in punch presses and while it is a fact that these presses have been developed to a high degree and normally links are produced which conform to, or closely enough to, standard dimensions, it is a fact that there are always some which do not come within required limits. That is especially true after heat treatment. The links are all subjected to an inspection and, of course, if any dimension of a link is not within the proper limits, that link will be cast out. Up to the development of the present machine, such links have been considered as scrap and over a period of time, loss from such scrap material and labor involved is very appreciable.

The dimension which most frequently varies beyond limits set up is that of the spacing between the ends of the forked hinge. That dimension is frequently too great or too small so that the link would impede feeding of the cartridge belt through the mechanism of the gun in the event the dimension was too great, or if too small, would cause that particular joint in the finally assembled belt to be tight and accordingly, such stiffness would cause the belt to feed with difficulty.

The machine is fed by hand although that is not entirely necessary. Links are guided into a rotating feeding element which is adapted to receive each link in a predetermined relationship to a die or dies past which the feeding means will move the links to be affected thereby. In the event the ends of the forked hinge of a link are too widely spaced, a die is employed which will squeeze those ends together until they have attained a dimension falling within limits prescribed. If the dimension is too small, that is, those ends of the link are too closely spaced, then a centrally disposed die is employed which will spread them until the same desired result is obtained.

The invention may be practiced in two generally different ways, that is, a separate machine may be employed to perform each of the above-mentioned functions, or a single machine may be

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so constructed as to treat both conditions of the links. By the first method one machine may treat only such links as have the forked hinge portion too widely spaced while another machine may be used for the reverse condition of the links. When both functions are performed automatically in a single machine, all links are fed into the receiving and advancing means and pass through a die construction for squeezing together the ends which are too widely spaced, then pass a second die adapted to engage between the forked ends of links for spreading them, or vice versa. It is not material as to which of these dies is first engaged since each link will eventually be affected by both dies in the event it is of such a dimension that it requires treatment by that die. In a machine of this type all links may be passed through the dies without regard to whether or not any of them is defective. Inspection would then preferably be performed after links have been ejected from the machine. That modification in the process of handling links would allow them to be fed to the reclaiming machine without being separated into two groups as is required when two separate types of machine are employed. It further makes it unnecessary to run all links through an inspecting machine before reclaiming and then to re-inspect those links which were first defective and thereafter reclaimed.

In the following disclosure a preferred embodiment of the invention is described by way of example and the disclosure is not to be taken in a limiting sense, but rather, is merely illustrative of forms which the invention may take and a method by which it may be practiced.

Of the accompanying drawings:

Fig. 1 is a perspective view generally illustrating mechanism by means of which the invention is carried out;

Fig. 2 is a perspective view of one link which goes to make up a machine gun belt;

Fig. 3 is an elevation of a link showing the dimensions affected;

Fig. 4 is a section through a part of a machine having two dies and showing the manner in which links are received and advanced by the feeding means, the relative position of dies and guiding elements for the links;

Fig. 5 is a section taken at line 5—5, Fig. 4;

Fig. 6 is a section taken at line 6—6, Fig. 4; and

Fig. 7 is a section similar to that of Fig. 5, but being taken on line 7—7 of Fig. 4 and showing a link in position.

Referring to Fig. 1, the machine includes a ro-

tating shaft 1 mounted in suitable bearings, a link receiving and advancing means generally indicated by numeral 2, a driving motor 3, and a link guiding bar 4 and chute 5. The bearings, one of which is illustrated at 6 are mounted for convenience on a table or platform 7 having legs 8 and a lower supporting deck 9 to which the motor 3 is attached. The shaft 1 is driven at a relatively slow speed by the motor 3 through the inter-connecting driving means which includes a speed reducer 10, sprockets 11 and 12 and a chain 13. Any other convenient means may be employed depending upon the sources of power available and the particular installation at hand.

In machines which are intended for reclaiming only those links which have their forked hinge ends spaced too widely, bar 4 is of a dimension such that links which are not of that type will not be received by the bar and slide along it. In actual practice a suitable link containing means is positioned at the upper end of this bar 4 and operators place the links in proper position on the bar. Those links which will not readily slide on the bar are thrown into another group and will be subjected to treatment in the alternative type of reclaiming machine.

In Fig. 2 a link 14 is shown having forked hinge ends 15 and 16 and the oppositely directed, central hinge 17. In assembling a belt of this type, the machine gun cartridges form the hinge pivots and each cartridge case sets tightly in the forked ends 15 and 16, but the central hinge member 17 is of slightly larger diameter than the cartridge case at that point so as to provide a freely pivoting joint.

The same link is shown in Fig. 3 and the dimensions D and D^1 are those affected by the dies through which links are passed. D, if too small causes tightness in the joint formed at that point while D^1 when too great makes the total belt width excessive.

The links are placed on the bar 4 with the ends 15 and 16 straddling the bar and with each of the links facing in such a direction that they progress along the bar and down within chute 5 in the position shown in Fig. 4. In actual practice the die or dies employed in any particular machine are adapted to spring the ends of each link past a point which would theoretically bring them to the proper dimension. Upon being released by the die those parts of the link then retain some of the deflection imparted, but not all of it. There is a certain amount of spring or resilience in the stock from which these links are made and before being subjected to treatment, they have been heat treated. Thus it is essential to go beyond the point desired so that upon release by the dies, each link will approach closely enough to that dimension accepted as standard. A few links may originally be so far from that dimension that with a particular setting of dies best for the majority of links, they will not be effectively reclaimed. A gauge 18 is fixed to the bar 4 and links of the type just described will not go through that gauge so the operator can at that point cast them aside.

Referring to Figs. 4, 5 and 6, the link receiving and advancing means which has generally been indicated by numeral 2 is made up of a toothed wheel having a hub 19 keyed to the shaft 1 and peripherally formed with radially projecting lugs or teeth 20 at one side with corresponding lugs or teeth 21 at the opposite side, there being between the lugs 20 and 21 a cross member 22 all as illustrated in these figures. A plate 23 is attached to and is spaced from the main web 24 of the feeding means by screws 25 and spacers 26. The plate 23 is concentric with the remainder of this particular assembly and its outside diameter is slightly less than the outer diameter of the web 24, that difference being for the purpose of causing each link to be held with the central axis of the forked hinge ends 15 and 16 parallel to the shaft 1. The difference in diameter of the hinge ends 15 and 16 makes necessary a slight difference in the outside diameters of plate 23 and web 24.

The space between adjacent pairs of lugs 20 and 21 is somewhat greater than the outside diameter of central hinge 17 thereby allowing each link to drop into that space as the feeding means is slowly rotated past the lower end of the chute 5.

As lugs 20 and 21 pass below the chute 5 a single link is dropped into each space between lugs, the end 17 first falling into that space and thereafter the entire link drops until it comes to rest as supported by plate 23 and web 24.

Two die supporting brackets 27 and 28 are attached to the table 7 and extend upwardly and over shaft 1, these brackets being for the purpose of supporting cross plates 31 and 29 to which are attached the dies 30 and 33, 34, respectively. These dies are shown in greater detail in Figs. 5 and 6, Fig. 5 showing a single spreading die 30 which is positioned at the center of a plate 31, this die being for the purpose of spreading apart the hinge ends of links where the dimension between those ends is smaller than it should be. For simplifying the illustration, the link being acted upon has not been shown in Fig. 5. Fig. 6 shows the reverse type of die.

Starting at a point close to the chute 5, a link retaining and guiding member 32 is provided and is to engage between the ends 15 and 16 of each link. Member 32 is supported by a cross member 41 carried on brackets 27 and 28 and allows the links to slide freely along it, but does not allow them to move outwardly from the retaining slot in the feeding wheel until desired. Thus when a link has once been engaged between the lugs on the wheel, it must be advanced until it has been subjected to action by the dies and will not be released until it has moved around to a point where it is intended that it shall be ejected into a container or pass onwardly to some other machine such as a gaging machine.

In Fig. 6 the cross piece 29 carries dies 33 and 34 which are adapted to squeeze together the forked ends of a link. These dies converge so that as a link passes between them the sides of the link will be engaged thereby and bent toward each other.

It is to be understood that the die 30 will be used on machines in which links which are narrower than standard are to be treated. The combination of dies shown in Fig. 6 is to be used for the alternative condition of links, that is, links which are wider than they are supposed to be. These dies, whether convergent or divergent, are constructed so they taper in the opposite direction after maximum convergence or divergence, are constructed so they taper in the opposite direction after maximum convergence or divergence has been reached. Thus the action imparted is one in which deflection up to a predetermined point is followed by a gradual release of pressure.

The table 7 is cut away beneath the feeding wheel 2, and the guiding member 32 projects

through the opening therein as shown in Fig. 4. Links will slide down this member **32** and may fall into a container (not shown).

In the event both types of die are to be used in the same machine, Fig. 4, they will be mounted so that links first pass through one and then through the other. In that event there will be no attempt to distinguish between links which are spaced too closely or those which are too widely spaced, in other words, all links will be fed into the rotating feeding wheel and will be subjected to action of both dies, it being understood that a link will be altered by only that one of the dies by which it needs to be affected.

In the event both dies are placed in the same machine, die **30** fixed to plate **31** may be mounted in advance of dies **33** and **34** on plate **29**. It is to be understood that the reverse arrangement would be equally as effective.

For purposes of illustration the mechanism has been mounted on a table as a support but it may be supported in other ways and the driving means may be disposed at some other position relatively to the link reclaiming device. Several of these devices may be arranged to be driven by the same means of power.

Modification may be resorted to without departing from the spirit of the invention, or the scope thereof as defined by the claims.

I claim:

1. In a machine for reclaiming deformed machine gun belt links of resilient material, the combination of driving means engaging a succession of said links and conveying them in a determinate course, and a static die extending into said course and adapted frictionally to engage successive links as they are moved past, and to apply laterally directed pressure upon the deformed portions of the links as the result of their movement, to flex said portions sufficiently beyond their elastic limit so that they return to the desired dimension upon cessation of the flexing pressure.

2. In a machine for reclaiming deformed machine gun belt links having forked end portions made of resilient material, the combination of means for continuously feeding a succession of said links along a determinate course, and a die partly obstructing said course and adapted to engage the laterally inner sections of the forked end portions of successive links moving along said course and progressively to flex said portions, said die being an elongate somewhat tapered structure which the deformed local portions of the links straddle as they move along their course, the dimensions of said die being such as to flex said portions beyond the ultimate desired dimension so that upon partial recovery, after the links are disengaged from the die, the parts thereof attain the desired dimension.

3. In a machine for reclaiming deformed machine gun belt links having forked end portions made of resilient material, the combination of means for continuously feeding a succession of said links along a determinate course, and a die partly obstructing said course and adapted to engage the laterally outer sections of the forked end portions of successive links moving along said course and progressively to flex said portions, said die comprising two opposed portions between which the links pass, said die portions converging toward each other to flex opposed end portions of the links toward each other, the dimensions of said die being such as to flex said end portions beyond the ultimate desired dimensions so that upon partial recovery, after the links are disengaged from the die, the parts thereof attain the desired dimension.

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