BUMPER STABILIZER FOR A CAN BODY SIDE SEAMER

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FIG-2

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This invention relates to a bumper stabilizer for a can body side seamer and, more particularly, to a device for controlling the motion of the bumper element which delivers an impact to the interlocked edges of a can body blank in order to form the side seams of the can body.

In operation of high speed production can body makers, the can body side seams are formed by positioning can body blanks in rapid succession on a forming mandrel or horn, wrapping the blank about the horn to interlock hooks which were previously formed along the edges of the blank, and then hammering the interlocked hooks to form the side seam. Some hammers which have been employed for this purpose are mounted on slides which are reciprocable in accommodating slideways to deliver a blow during each stroke. Although such slides and complementary slideways provide a closely controlled motion, problems of lubrication have arisen from their use, primarily because of the tendency of flux applied to the can body blanks to drip onto the slide and foul it. Other hammers have been mounted on rotary members wherein the impact is delivered along an arcuate path. However, in such case there arises a problem in eliminating any substantial horizontal component of motion at the instant of impact which might cause an undesirable shearing of the side seams.

It is, therefore, an object of this invention to provide improved means for guiding and stabilizing the connecting rod and the bumper carriercarried thereby so that there will be no appreciable horizontal component of movement at the instant of impact.

It is further an object of this invention to provide means for guiding the bumper steel along a rectilinear path which means do not include slidably associated members.

In carrying out this invention, the cross head on which the bumper steel is carried is pivotally connected to the upper end of a connecting rod which, in turn, is reciprocated by a crank mounted on a crank shaft. Mounted on a depending portion of the cross head are a pair of rollers which engage and roll along parallel surfaces of a vertical member so that the cross head is guided along a vertical path to the forming horn and maintained in a vertical disposition. In cooperation with the vertical guide member is a long control arm which is pivoted to the frame of the machine and to the cross head to prevent any deviation of the cross head from its intended path so that the point of impact will be precisely where intended. The control arm is mounted so that at impact it is perpendicular to the vertical path of the cross head so that in the short arc through which the end of the arm travels there is no appreciable horizontal component of motion.

Other objects and advantages of this invention will become apparent from the description following when read in conjunction with the accompanying drawings wherein:

FIG. 1 is a view in end elevation of a can body side seamer employing a rectilinear stabilizing and guiding member in accordance with this invention; and

FIG. 2 is a side view in section taken along line 2—2 of FIG. 1.

Now referring to the drawings with greater particularity the machine, which is generally designated by the reference numeral 10 includes a frame structure 12 on which is carried the forming horn 14 and operating mechanism for the bumper 16 hereinafter to be described. The forming horn or mandrel 14 is of known construction and includes a slot 17 to accommodate a reciprocable stripper which removes the formed can body.

The operating mechanism for the bumper includes a crank shaft 20 driven from any suitable source of power (not shown). A connecting rod 22 is rotatably mounted on a bushing 24 which in turn is rotatably carried on the crank pin 26 of the crankshaft 20 (FIG. 2). Thus, the end of the connecting rod 22 carries a pin 28 on which is rotatably mounted a cross head 30. A bumper steel 32 is secured at the upper end of the cross head by any suitable means such as cap screws 34 and clamping block 35 (FIG. 1). Thus, it will be apparent that as the crank shaft 20 rotates the connecting rod 22 will cause the cross head to reciprocate between a position spaced below the mandrel 14 upwardly to impact against the mandrel and crimp the interlocked edges of the can body. As indicated in phantom in FIG. 1 a narrower bumper steel is provided for can body blanks of larger diameters so that the stroke of the connecting rod and cross head 30 imparted by the crankshaft will function to seam cans of various diameters.

At one end of the cross head 30, a roller carrier member in the form of a depending arm 36 rotatably supports a pair of rollers 38 which straddle a vertically disposed guide member or block 40 of hardened steel or the like secured to a mounting plate 41 bolted to the frame 12. The guide rollers 38 are rotatably mounted on pins 42 (FIG. 1) which are eccentrically carried on square adjustment members 44 secured with split sleeves 46 on the cross head extension member 36. Thus, the cap screws 48 may be loosened and the square adjustment members turned to vary the location of the roller axes and, thus, adjust the clearance between the rollers 38 and the guide block 40. Desirably, the rollers 38 are adjusted when the connecting rod 22 is in its lowest position, so as snugly to embrace the guide block. As so adjusted, the sides of the block will closely guide the movement of the cross head with just a slight tolerance permitted, as will hereinafter be explained. The guide block 40 is disposed in vertical alignment with the axis of the cross head pivot pin 28 so that just unengagement of the rollers 38 astride the block 40 maintain the cross head in vertical disposition and as the rollers traverse the vertical sides of the block 40 the cross head is constrained to traverse a vertical path.

If desired, the eccentric mountings may be adjusted differentially so that, with the connecting rod 22 disposed in its uppermost position, the bumper steel is at a slight angle to the vertical. This is desirable in some cases to deliver a harder blow on one side of the overlapped seam in order to assure a tight seal. It will be noticed that, even with the bumper steel at a slight angle, the blow is still delivered vertically.

In cooperation with the guide rollers 38 and block 40, there is provided a control or guide arm 50 pivotally mounted at one end on a pin 52 carried on a mounting block 54 secured to the frame 12 by any suitable means such as the cap screws 55. The control arm 50 is pivoted at its other end to a pin 56 carried on a mounting block 58 carried on the cross head. The arm 42 constrains movement of the cross head 30 to a fixed path and establishes the point of impact P precisely. The pin 52 is positioned so that when the cross head 30 reaches the point of impact P with the forming horn 14, the arm 42 will be horizontally disposed. Consequently, the tangent to the arc through which the pin 56 swings is a vertical line and the cross head itself has substantially no horizon-
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In a can body side seamer having a machine frame, and a horn on said frame for supporting a can body blank thereon with hooks along opposite edges of said blank interlocked, means for delivering an impact to said interlocked edges comprising:
a driven crankshaft,
a connecting rod having one end portion thereof mounted on said crankshaft,
a cross head pivotally mounted adjacent the other end portion of said connecting rod,
a guide member having opposite sides parallel to a diameter of said crankshaft at the rotational axis thereof,
a roller carrier member, and
a pair of guide rollers on said carrier member each being disposed in rolling engagement with one of said parallel sides,
one of said members being carried by the machine frame with the other member being carried by the cross head.

4. The combination defined in claim 1 comprising a pivotable guide arm pivotally connected to said cross head and to said machine frame, said guide arm being disposed generally normal to said diameter of said crankshaft.

5. The combination defined in claim 1 wherein the stroke of said cross head produced by rotation of said crankshaft is limited so as to pivot said guide arm through an arc of less than ten degrees.

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