March 24, 1942. E. LAXO 2,277,519

CAN BODY FORMING APPARATUS

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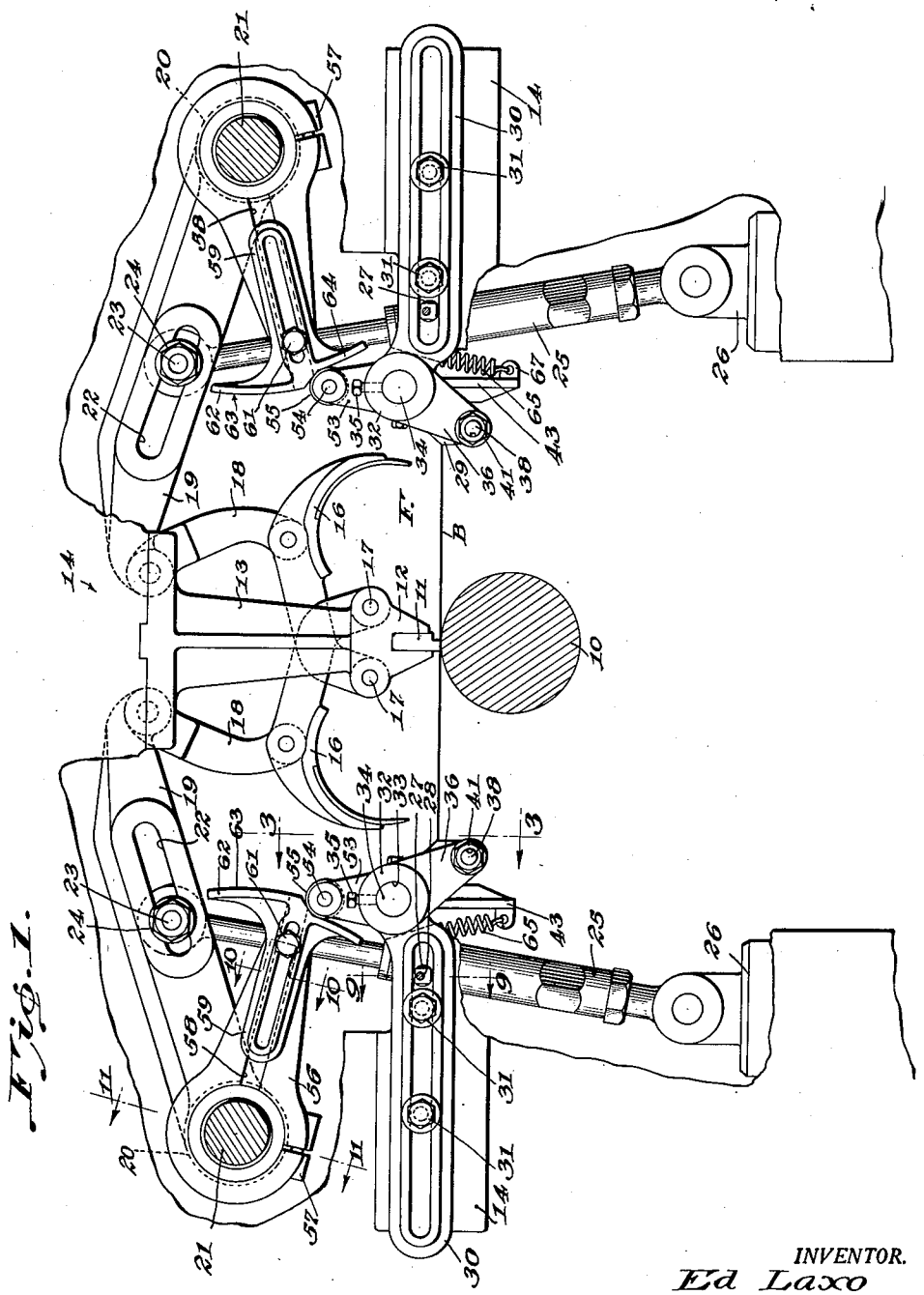


Fig. 1.

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CAN BODY FORMING APPARATUS

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Fig. 2.

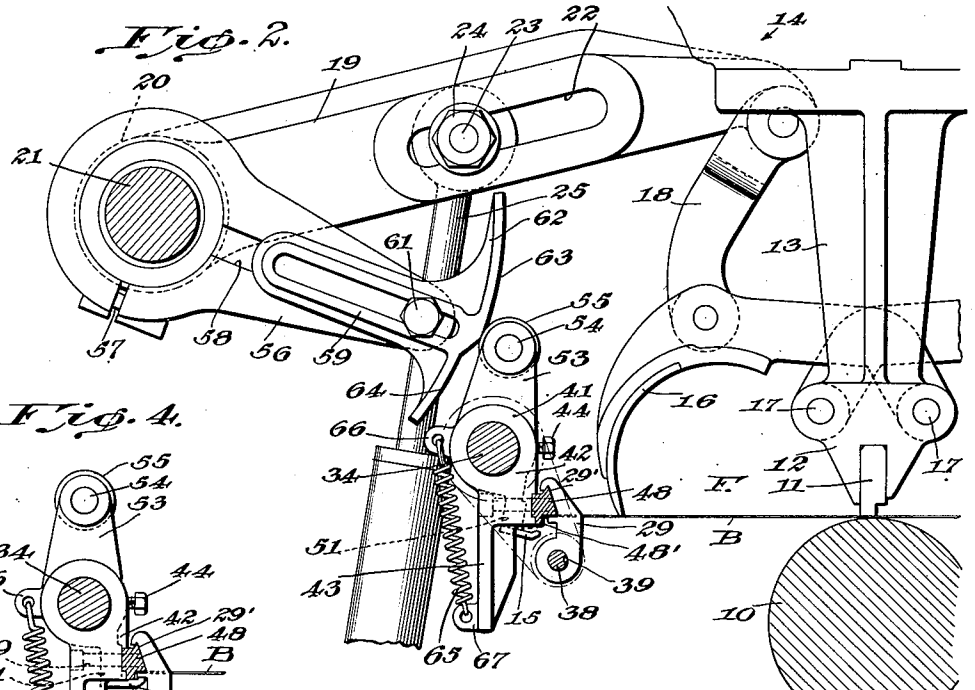


Fig. 4.

Fig. 6

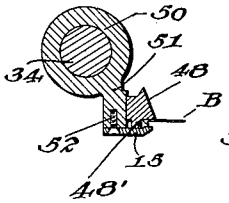


Fig. 3.

Fig. 5.

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Fig. 7.

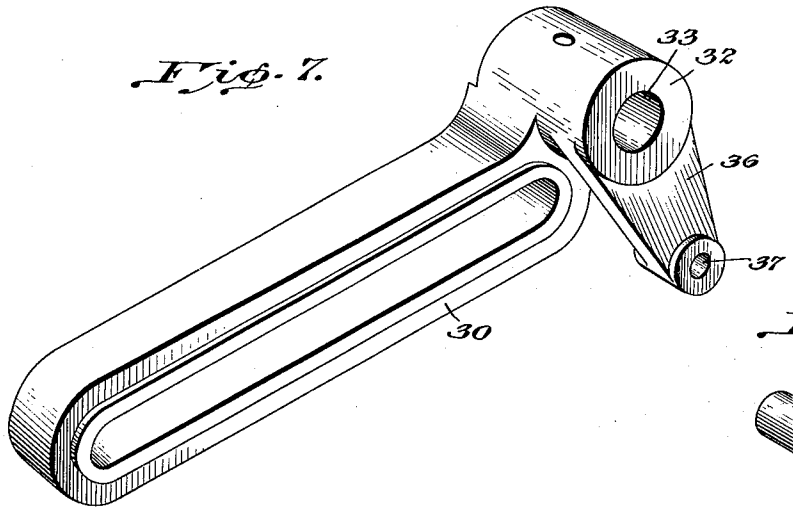


Fig. 8.

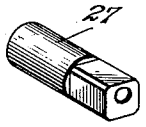


Fig. 9.

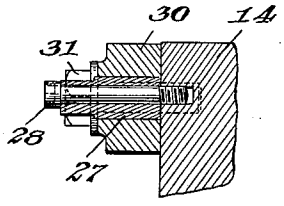


Fig. 10.

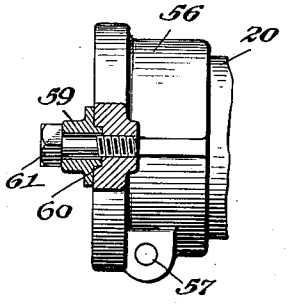
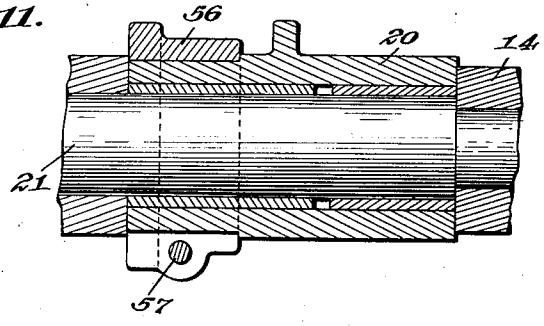


Fig. 11.



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UNITED STATES PATENT OFFICE

2,277,519

CAN BODY FORMING APPARATUS

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Application May 23, 1939, Serial No. 275,192

4 Claims. (Cl. 153—44)

The present invention relates to can body forming apparatus and more particularly to a body blank supporting mechanism by means of which the side edges of the body blanks are supported during positioning of the blanks on the forming anvil or horn preparatory to the actual bending of the blanks to cylindrical shape therearound.

Heretofore in supporting the body blanks, preparatory to bending the same to cylindrical shape on the forming horn, a stationary edge-supporting ledge or shoulder underlies each hooked side edge of the blank to support the same while the blank is centered on the forming horn and clamped thereto along a longitudinal center line by means of a clamping head. As the clamping wings engage the upper surface of the blank to wrap the blank about the forming horn, each half of the blank on opposite sides of the line of contact between the blank and horn is flexed downwardly so that the side edges of the blank are forcibly pulled or sprung from their respective supporting ledges. Because of minute discrepancies in the character of the blank edges themselves, in the nature of the supporting shoulder, or in the manner in which the blanks are centered on the forming horn, it very frequently happens that one edge of a blank will be forcibly sprung from its respective shoulder before the other edge has left its respective shoulder. The net effect of this is to so jar the blank that the same becomes misaligned on the forming horn with the ultimate result that an uneven seam is formed in the shaped can body, or in extreme instances, the hooked side edges of the can body fail to become interlocked.

The present invention is designed to overcome the above noted limitation that is attendant upon the use of such fixed supporting means for the blanks and accordingly, has for its principal object, the provision of a pair of movable and automatically operable supporting members which underlie the side edges of the blanks and support the same preparatory to the actual forming operation and which, when the forming wings come into engagement with the upper surface of each blank in the usual manner to flex the same around the forming horn, are automatically withdrawn from beneath the side edges of the blank, thereby eliminating the necessity of springing the blank from its supporting means and consequently eliminating the tendency of the blank to become misaligned on the forming horn.

Another object of the invention is to provide an apparatus of the character set forth above, in which the movements of the supporting members are dependent upon and synchronized with the movements of the forming wings and may be regulated with respect thereto in order that the side edges of the blank may be supported and the blank itself properly aligned with the forming horn and held against shifting thereon until the precise moment when the forming wings come into engagement with the blank and the forming operation has actually commenced.

Another object of the invention is to provide such an apparatus in which the supporting and aligning means for the blanks may be adjusted toward and away from each other to accommodate blanks of different widths, while at the same time the operating mechanism for the supporting means may be adjusted to compensate for the adjustment of the latter.

A still further object of the invention is to provide an apparatus of the character set forth which may accommodate can body blanks of varying lengths as well as of varying widths.

Other objects of the invention not at this time enumerated will become apparent hereinafter.

In the accompanying drawings:

Fig. 1 is a fragmentary transverse sectional view taken through a body-making machine showing the improved body blank mechanism applied thereto.

Fig. 2 is an enlarged detail fragmentary transverse sectional view similar to Fig. 1 with the parts in a different position.

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken substantially along the line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 3.

Fig. 6 is a sectional view taken substantially along the line 6—6 of Fig. 3.

Fig. 7 is an enlarged perspective view of an adjustable supporting bracket employed in connection with the present invention.

Fig. 8 is an enlarged perspective view of an eccentric adjusting pin employed in connection with the invention.

Fig. 9 is a sectional view taken substantially along the line 9—9 of Fig. 1.

Fig. 10 is a sectional view taken substantially along the line 10—10 of Fig. 1, and

Fig. 11 is a sectional view taken substantially along the line 11—11 of Fig. 1.

Referring now to Figs. 1 and 2, the body blanks B which have previously been fed from a stack and treated at a notching and slitting station

and provided with hooked side edges at a hook forming station, are successively fed to and arranged on a forming horn 10 at a forming station F by conventional mechanism (not shown) preparatory to the formation of can bodies by interlocking the edges of the blanks.

A clamping steel 11 held in a clamping head 12, formed on a bracket 13, suspended from the framework 14 of the machine, cooperates with the forming horn 10 in clamping the blanks B medially in position on the horn. By means of conventional mechanism (not shown) a slight upward movement of the horn, after each blank is in position on the latter, is effected to bring about a clamping engagement of the steel and horn with the blank. The hooked side edges of the blank are supported on a pair of movable shoulder pieces 15 (Figs. 5 and 6) and precisely as the forming operation commences, during which the blank is wrapped about the forming horn, the shoulder pieces 15 are withdrawn from beneath the edges of the blank so that there will be no tendency for the edges of the blank to spring from their supports and shift out of alignment with the horn, as frequently occurs at present.

The forming mechanism consists of a pair of forming wings 16 of conventional design, which are pivoted upon hinge pins 17, on opposite sides of the clamping head 12, and adapted to be swung downwardly in unison from the elevated position they occupy in Fig. 1, to a position wherein they enclose or embrace the forming horn 10. In thus moving, the forming wings 16 engage the blank on opposite sides of the horn and wrap the same around the horn to effect interlocking of the hooked edges, after which the seam thus formed, is treated at the usual bumping station.

In order to actuate the forming wings 16, each wing (Figs. 1 and 2) is connected by means of a link 18 to the free end of a rocker arm 19 having a sleeve portion 20 oscillatively mounted upon a shaft 21 which is supported in the framework 14. The arm 19 is provided with a slot 22 through which there extends a wrist pin 23, the latter being adjustably clamped in the slot by means of a clamping nut 24. An adjustably extensible connecting rod 25 connects the wrist pin and a vertically reciprocable slide member 26, the vertical movements of which are derived from conventional eccentric crank mechanism (not shown) or by other preferred means. By loosening the nuts 24, and adjusting the position of the wrist pins 23 in the slots 22, it is obvious that the throw of the arms 19 and consequently that of the forming wings 16, may individually be regulated and controlled.

The arrangement of parts thus far described, with the exception of the movable shoulder piece 15, is more or less conventional and no claim to any novelty connected therewith is made herein, the novelty of the present invention residing rather in the mechanism for actuating the shoulder piece 15 which will now be described.

Still referring to Figs. 1 and 2, and also to Fig. 7, a slotted supporting bracket 30 is adjustably clamped in a substantially horizontal position by means of clamping studs 31, to the machine framework 14, and is formed at its inner end with a boss 32 provided with a bore 33 extending therethrough. A rotatable eccentric adjusting pin 27 having a squared end, extends through the slot in the bracket 30 and is adapted to be clamped in any desired position by means of a clamping bolt 28. The diameter of the studs 31 is less than the width of the slot in the bracket 30 and thus, by loosening the studs 31 and also the clamping bolt 28, an accurate fine adjustment of the elevation of the inner end of the bracket 30 may be effected by turning the eccentric adjusting pin 27. The studs 31 and clamping bolt 28 are thereafter tightened to support the bracket in its adjusted position and thereby securely lock the corresponding shoulder piece 15 in position to receive an edge portion of the blanks.

A shaft 34 is secured against turning movement in the bore 33 by means of a set screw 35 (see also Figs. 2 and 3). A collar 41 (Figs. 3 and 4) having a depending leg 42, from which there projects an extension 43, is secured by means of a set screw 44 to the non-rotatable shaft 34 and is positioned in close proximity to the boss 32. A second collar 45 having a leg 46 is secured by means of a set screw 47 to the free end of the shaft 34. A guide bar 48 (Fig. 5) is secured by means of studs 49 to the depending legs 42 and 46 of the collars 41 and 45 respectively, and bridges the distance between them. The guide bar 48 is formed with a vertical confining wall 48' designed to prevent lateral shifting or turning of the blanks B on the forming horn 10. While the height of the confining wall 48' is relatively small, it is nevertheless of sufficient extent that it does not release the edge of the blank, after the latter has been engaged by the forming wings 16, until the blank is sufficiently flexed that the tension existing in the blank will prevent shifting thereof on the horn 10.

Referring now to Figs. 1, 3, and 7, an ear 36 depends from the bracket 30 and is formed with a bore 37 adjacent its lower end through which there extends a threaded rod 38. A keyway 39 provided in the rod 38 cooperates with a pin 40 or key carried by said ear in preventing turning of the rod in the bore 37. Clamping and adjusting nuts 41 on opposite sides of the ear 36 permit longitudinal adjustment of the rod 38 in the bore 37. The rod 38 carries at one end thereof an abutment 29 against which the forward edges of the can body blanks B, fed to the forming horn 10, are adapted to strike, thus accurately determining the forward position of each blank relative to the horn. The abutment 29 and guide bar 48 (Figs. 2 and 4) are formed with a sliding dovetail connection 29' by means of which turning of the abutment on the shaft 39 is prevented. Because of the adjustment by means of which the rod 38 may be shifted longitudinally in the bore 37, it is possible to accommodate body blanks of different heights.

Tiltably mounted on the shaft 34 (Figs. 3 and 6) and extending between the two collars 41 and 45 is a sleeve 50 provided with a downwardly extending rib or flange 51 to which there is secured by means of studs 52, the previously referred to shoulder piece 15, upon which the hooked ends of the can body blanks B are adapted to be supported prior to the forming operation.

The sleeve 50 (Figs. 1 and 3) is formed with a pair of upwardly extending arms 53 in the upper ends of which a shaft 54 is mounted. A cam roller 55 is rotatably mounted upon the shaft 54. A cam arm 56 (Figs. 1, 2, and 3) having a split clamping connection 57 (Fig. 10) with the sleeve 20, is formed with a longitudinal channel 58 or guideway therein. A slotted cam member 59 is formed with a projection 60 that fits into the channel 58 and a clamping bolt 61 extends through the slot in the cam member and serves to adjustably clamp the latter to the cam arm 56.

A foot 62 formed at the outer end of the cam member 59 is provided with a cam surface including a raised portion 63 and a lowered portion 64 designed for engagement with the cam roller 55. A coil spring 65 secured at one end to an ear 66 on the sleeve 50 and at the other end to an ear 67 at the lower end of the extension 43, serves to apply a torque to the sleeve 50, normally maintaining the roller 55 in contact with the foot 62.

In the operation of the apparatus, when the arms 19 (Fig. 1) move downwardly, carrying with them the cam arms 56 and simultaneously actuating the wings 16, the cam rollers 55 ride outwardly on the inclines existing between the raised portions 63 and the lowered portions 64 immediately prior to engagement of the can body blank B by the tips or ends of the wings. Thus the two sleeves 50 are rotated to retract the shoulder pieces 15 from beneath the hooked edges of the blanks as shown in Fig. 2. The hooked edges of the blank are left without a support therebeneath but the vertical edges 48' of the guide bars 48 confine the blank therebetween and prevent shifting of the latter as the tips or ends of the wings 16 engage the blank. The edges 48' retain their confining function during the initial flexing of the blank and, by the time the edges of the blank have moved downwardly so as to clear the confining edges 48', the blank is sufficiently flexed and under tension that there is no further tendency for the same to shift on the forming horn 10.

The rollers 55 continue to ride upon the elevated portions 63 of the feet 62 until the blank is completely wrapped about the horn and the hooked edges thereof are united. Thereafter, upon elevation of the arms 19 and cam arms 56, the wings 16 are restored to their elevated positions and, during elevation thereof, the cam rollers 55 again pass onto the lowered portions 64 to restore the shoulder pieces 15 to their projected positions preparatory to reception thereon of the hooked edges of the next succeeding blank.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. In a machine for making can bodies, in combination, a forming horn upon which the body blanks are formed, a pair of forming wings adapted to close about the horn, means for moving the wings between open and closed positions, means for clamping a flat blank in a horizontal position tangentially on the horn, and means for releasably supporting each side edge of the blank, said means comprising a tiltable member, a shoulder piece on the member for supporting a side edge of the blank and movable upon tilting of the member from a supporting position beneath the edge to a retracted position, a horizontal shaft, a rocker arm mounted for movement about the axis of the shaft, a link connecting the arm to one of the forming wings, a second arm mounted for rocking movement about the axis of the shaft, means preventing relative movement between said arms, a cam member on said second arm, means on the tiltable member engaging said cam member, and means for tilting said first mentioned arm.

2. In a machine for making can bodies, in combination, a forming horn upon which the body blanks are formed, a pair of forming wings adapted to close about the horn, means for moving the wings between open and closed positions, means for clamping a flat blank in a horizontal position tangentially on the horn, and means for releasably supporting each side edge of the blank, said means comprising a tiltable member, a shoulder piece on the member for supporting a side edge of the blank and movable upon tilting of the member from a supporting position beneath the edge to a retracted position, a horizontal shaft, a rocker arm mounted for movement about the axis of the shaft, a link connecting the arm to one of the forming wings, a second arm mounted for rocking movement about the axis of the shaft, means preventing relative movement between said arms, a cam member adjustably secured to the second arm, a foot having a cam surface formed on the cam member, a cam roller eccentrically mounted on the tiltable member, means normally urging the tiltable member to a position wherein the cam roller engages the cam surface of the foot, and means for tilting said first mentioned arm.

3. In a machine for making can bodies, in combination, a forming horn upon which the body blanks are formed, a pair of forming wings adapted to close about the horn, means for moving the wings between open and closed positions, means for clamping a flat blank in a horizontal position tangentially on the horn, and means for releasably supporting each side edge of the blank, said means comprising a tiltable member, a shoulder piece on the member for supporting a side edge of the blank and movable upon tilting of the member from a supporting position beneath the edge to a retracted position, a horizontal shaft, a rocker arm mounted for movement about the axis of the shaft, a link connecting the arm to one of the forming wings, a second arm mounted for rocking movement about the axis of the shaft, means preventing relative movement between said arms, a cam member adjustably secured to the second arm, a foot having a cam surface formed on the cam member, a cam roller eccentrically mounted on the tiltable member, means normally urging the tiltable member to a position wherein the cam roller engages the cam surface of the foot, means for tilting said first mentioned arm, and means for adjusting the position of said cam member on the second arm.

4. In a machine for making can bodies, in combination, a forming horn upon which the body blanks are formed, a pair of forming wings adapted to close about the horn, means for moving the wings between open and closed positions, means for clamping a flat blank in a horizontal position tangentially on the horn, and means for releasably supporting each side edge of the blank, said means comprising a horizontal shaft, a sleeve tiltably mounted on the shaft, a shoulder piece on the sleeve for supporting a side edge of the blank and movable upon tilting of the sleeve from a supporting position beneath the edge to a retracted position, a horizontal shaft, a rocker arm mounted for movement about the axis of the shaft, a link connecting the arm to one of the forming wings, a second arm mounted for tilting movement about the axis of the shaft, means preventing relative movement between the arms, a cam member on said second arm, means on the sleeve normally engaging said cam member, a bracket secured to the shaft on which the sleeve is mounted, a rod slidably mounted in the bracket, means securing the rod in any desired adjusted position, a blank-engaging abutment on the rod, and means for tilting one of the arms.

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