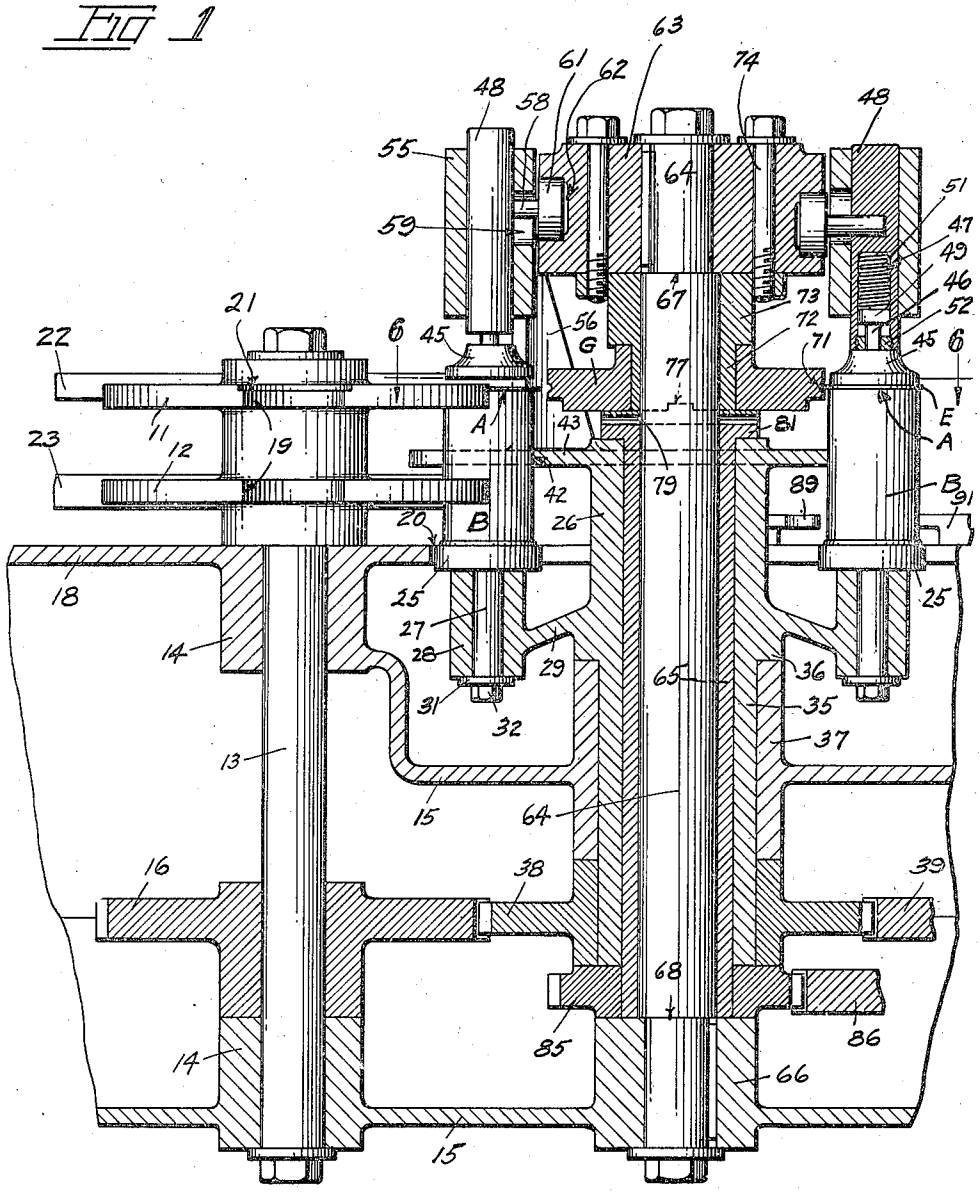
Jan. 11, 1949. R. E. RENARD 2,458,529

MECHANISM FOR CLINCHING COVERS ONTO CANS

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FIG 1



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MECHANISM FOR CLINCHING COVERS ONTO CANS

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Fig 2

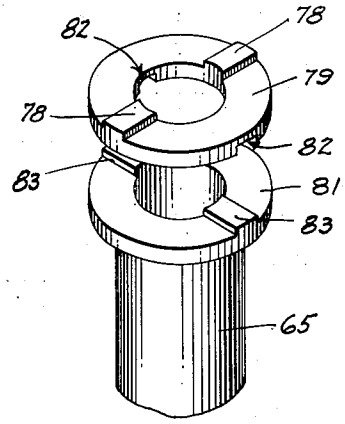


Fig 3

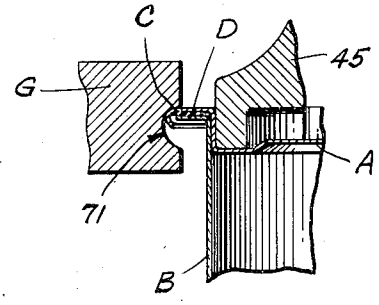
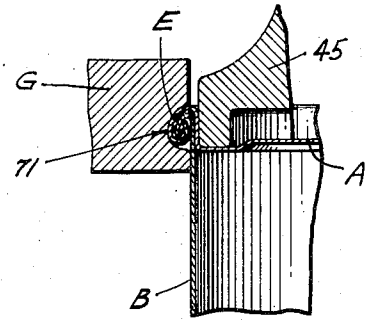


Fig 4



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Fig 6

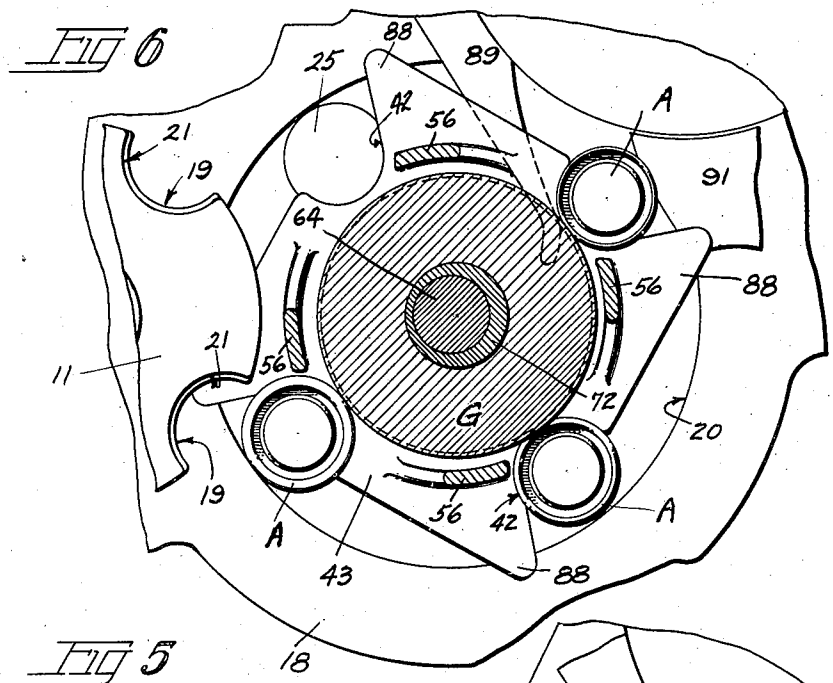
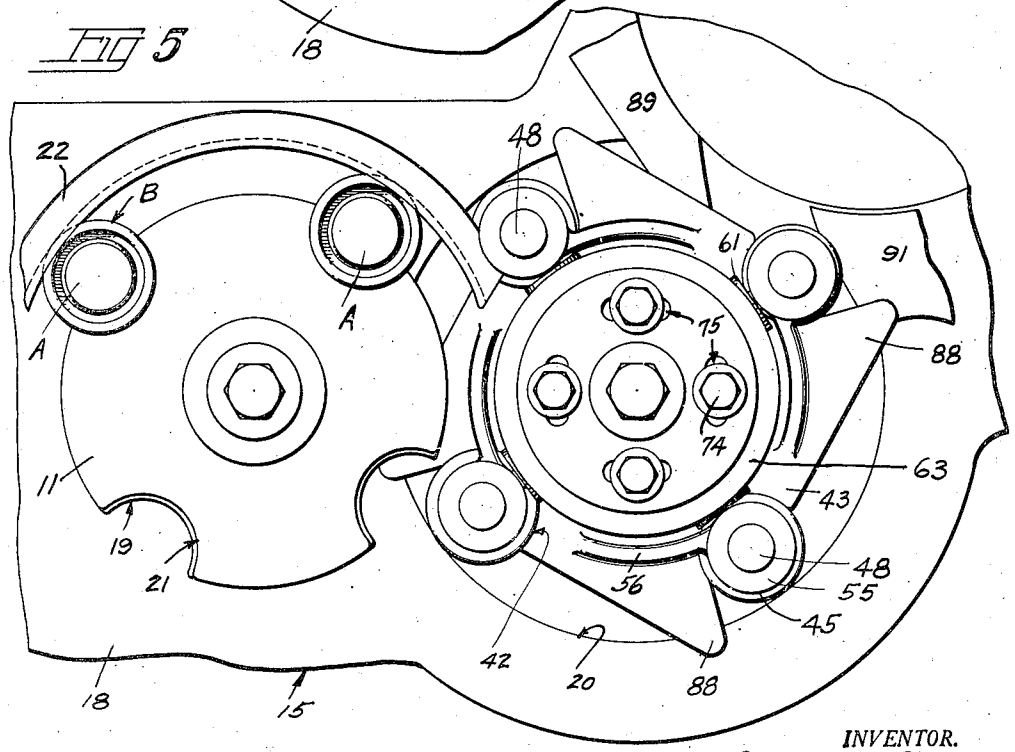


Fig 5



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MECHANISM FOR CLINCHING COVERS ONTO CANS

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Application May 17, 1945, Serial No. 594,324

4 Claims. (Cl. 113—17)

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The present invention relates to a clinching mechanism and has particular reference to an improved mechanism which utilizes eccentricity between cooperating parts for clinching or seaming sheet metal covers in place on sheet metal containers or cans at high speed rates of production.

An object of the invention is the provision of a rotary type clinching mechanism utilizing a clinching wheel member and a support member revoluble relative to the clinching wheel member for supporting a can and a superimposed cover, wherein one of said members is disposed eccentrically relative to the other for bringing the cover and the can gradually and gently into engagement with the clinching wheel member to perform the clinching operation so that such clinching operation may be effected at a high speed rate of production.

Another object is the provision of such a high speed clinching mechanism wherein suitable adjustment may be made between the clinching wheel member and the can support member to compensate for variations in the clinching operations.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a vertical section taken through a clinching mechanism embodying the instant invention, with parts broken away and with cans shown in place in the mechanism;

Fig. 2 is an enlarged perspective view of a detail of the mechanism, with parts broken away;

Figs. 3 and 4 are enlarged fragmentary vertical sectional views of the clinching members of the mechanism as effective on a can and cover and illustrating two stages of the clinching operation;

Fig. 5 is a top plan view of the mechanism shown in Fig. 1 with parts broken away; and

Fig. 6 is a horizontal section taken substantially along the line 6—6 in Fig. 1.

As a preferred embodiment of the instant invention the drawings illustrate a rotary mechanism for clinching sheet metal can end members or covers A (Figs. 3 and 4) onto sheet metal cans B as by a partial interfolding of flange portions C, D on these parts respectively to unite the cover loosely with the can in a clinched seam E. However, the invention is equally well adapted to

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seaming operations wherein a complete interfolding of the flange portions C, D is effected to produce the well known doubleseam or other suitable seam or other bending operation. The mechanism may be a part of or may be attached to a more elaborate machine such as a can closing machine or the like and hence certain parts of such a machine are illustrated in the drawings.

In the clinching mechanism the cans B are received in a vertical position with the covers A superimposed upon the top ends of the cans. The cans and covers while in this position are carried along a circular path of travel adjacent a rotating, eccentrically mounted clinching wheel G and while traversing their circular path of travel the flange portions C, D of the can and cover merely wipe against the wheel. This may complete the clinching operation in one high speed sweep as the cans move past and without any lateral movement of the can. Engagement of the flange portions C, D of the can and cover with the clinching wheel frictionally rotates these parts against the wheel and thus effects the interfolding of the flange portions to produce the seam E. Immediately thereafter the cans are discharged to any suitable place of deposit which may be to other stations in a more elaborate machine for further treatment such as vacuumizing and final seaming.

The clinching mechanism preferably includes a device for feeding and spacing the cams B and their superimposed covers A, in timed order. This comprises a pair of horizontal continuously rotating feed turrets 11, 12 (Figs. 1 and 5) located one above the other and mounted on the upper end of a vertical shaft 13 journaled in a pair of spaced bearings 14 formed in a frame 15 which may constitute the main frame or a subframe of the machine to which the clinching mechanism is attached. The shaft 13 is rotated continuously through a gear 16 which is carried on the shaft adjacent its lower end.

The frame 15 is formed with a horizontal table 18 along which the cans B move while they are in the turrets 11, 12. The turrets are formed with spaced peripheral pockets 19 for receiving and propelling the cans across the table along a curved path of travel, the upper turret 11 also being provided with a seat 21 adjacent its pockets 19 for the reception of the covers superimposed on the cans. The drawings show four of these pockets in each turret. Curved upper and lower guide rails 22, 23 disposed adjacent the path of travel of the cans and their covers hold them in their pockets as the turrets move them forward.

The feed turrets 11, 12 deliver a can and its cover onto one of a plurality of spinner plates 25 carried on a rotary can supporting body member 26 disposed adjacent the turrets. These spinner plates are flush with the top of the table 18 and they operate in an opening 20 formed in the table and surrounding the body member. The drawings show four of these spinner plates one for each pocket 19 in the feed turrets 11, 12 and they are arranged in a circle and are concentric with the body member 26. The spinner plates are secured to the upper ends of vertical stems 27 which are carried in bearings 28 connected by a web 29 to the body member 26. The stems 27 are freely rotatable in their bearings but are held against vertical displacement by washers 31 and by studs 32 threadedly engaged in the lower ends of the stems.

The body member 26 at the bottom end merges into a reduced diameter sleeve 35 which construction creates a supporting shoulder 36 on the lower end of the body member. The sleeve is rotatably journaled in a main bearing 37 formed in the frame 15 and the shoulder 36 rests on the top edge of the bearing. The lower end of the sleeve extends down below the bearing and carries a gear 38 fixed thereto which meshes with the gear 16 on the feed turret shaft 13. Gear 38 is driven in any suitable manner such as by a gear 39 which may be a main drive gear of the machine to which the clinching mechanism is attached. Through this gear connection with the feed turret shaft, the body member 26 and the feed turrets 11, 12 are rotated in synchronism so that the spinner plates 25 come into registry with the pockets 19 of the turrets to receive the cans from the turrets.

A can B received on a spinner plate 25 is located in a centralized position on the plate by entering a pocket 42 formed in a star wheel 43 which extends out horizontally or radially from the body member 26. There are four of these pockets, one for each spinner plate and they also cooperate with the pockets 19 in the feed turrets in properly receiving the cans on the spinner plates.

As soon as a can B is fully positioned on a spinner plate 25, its cover A is clamped down tightly on the end of the can and this clamping pressure holds can and cover against the spinner plate for the clinching operation to follow. This clamping action is brought about by a freely rotatable chuck 45 which is disposed above the spinner plate in vertical alignment therewith. There are four of these chucks, one for each plate. Each chuck is formed with an upright stem 46 which extends up into a bore 47 in a vertically disposed slide bar 48. The inner end of the stem is provided with a head 49 and a compression spring 51 interposed between this head and the bottom of the inner end of the bore 47 provides a yieldable backing for the chuck. A stop collar 52 threadedly secured in the lower end of the slide bar retains the chuck in place in the bar.

The slide bars 48 are carried in slide bearings 55 which are connected by webs 56 to the star wheel 43. Thus these slide bearings and the chucks carried within them as well as the spinner plates 25 and their bearings 28 all rotate as a unit with the body member 26.

The slide bars 48 are vertically movable through cam action. For this purpose each slide bar carries a horizontal pin 58 which projects through a clearance slot 59 in the slide bearing. This pin carries a cam roller 61 which operates in a cam groove 62 of a stationary barrel cam 63. The cam

is keyed to the upper end of a stationary shouldered column 64 which extends through a coupling sleeve 65 journaled in the body member 26. The lower end of the column is secured in a boss 66 formed in the frame 15. Shoulders 67, 68 formed on the column keep the cam 63 in a predetermined vertical position. The body member 26, its bearing 37, the coupling sleeve 65, and the column 64 are all concentrically disposed.

Hence as the body member 26 rotates, it moves the spinner plates 25 and chucks 45 through a circular path of travel concentric with the stationary column 64 and causes the cam rollers 61 to traverse the cam groove 62 in the stationary cam 63. The cam groove is so shaped as to bring a chuck 45 down onto the can and its cover just as the can is delivered into a fully seated position on its spinner plate 25. The cam holds the chuck in this clamping position during the clinching operation which immediately follows and then releases the clinched can for discharge from the mechanism.

As hereinbefore mentioned, the clinching operation is effected by the rotatable clinching wheel G which is formed with an annular clinching groove 71 (see also Figs. 3 and 4) in its outer periphery. This groove is maintained in the horizontal plane of the cover and can flange portions C, D as the cans move around the wheel.

The wheel G is adjustably mounted on an eccentric hub 72 (see also Figs. 1 and 6) which constitutes the lower end of an annular, stationary eccentric collar or bearing member 73 surrounding column 64. This collar is secured by bolts 74 which are threaded in the collar and which extend up through horizontally elongated slots 75 (Fig. 5) in the stationary cam 63. The slots in the cam are provided for radial adjustment of the eccentric collar so that the eccentric hub of the collar can be turned into the desired position to compensate for predetermined variations in the tightness or looseness of the clinching of the covers onto the cans.

The bottom surface of the clinching wheel G is cut diametrically to provide driving notches or recesses 77 (Fig. 1) in which driving lugs 78 (Fig. 2) engage, these lugs being formed on the upper surface of a loose coupling ring 79. The ring 79 surrounds the column 64 and is interposed between the clinching wheel and a flange 81 formed on the upper end of the coupling sleeve 65. The bottom surface of the ring is cut diametrically to form notches 82 which are preferably disposed at right angles to the lugs 79. These notches 82 engage with lugs 83 formed on the upper surface of the flange 81.

This combination of coupling parts provides a universal or movable joint connection between the clinching wheel G and the coupling sleeve 65 so that the rotation of the sleeve readily rotates the wheel eccentrically relative to the column 64. The sleeve is continuously rotated by a gear 85 which is mounted on the lower end of the sleeve and which is driven in any suitable manner such as by meshing connection with a gear 86 of the machine to which the clinching mechanism is attached.

The clinching wheel G is rotated at a faster rate of speed than that of the body member 26 and preferably in the same direction of travel. Hence the can and its cover, as soon as they are clamped in position on their spinner plate 25 come under the influence of the clinching wheel. Since they revolve concentrically with the column 64, their flange portions C, D enter into the

clinching groove 71 of the eccentrically mounted, rotating clinching wheel G. This initial groove positioning is best shown in Fig. 3. The clinching pressure gradually and gently increases as greater engagement with the wheel takes place as the clinching proceeds. It will be understood that the cover flange C in first contacting the clinching wheel causes rotation of the cover and the can. The chuck and the spinner plate being freely mounted for rotation therefore in turn rotate in unison with the can.

As the rotating cover and can continue to revolve concentrically with the column 64 and around the offset or eccentric clinching groove of the wheel G, the cover flange C and the can flange D gradually and uniformly curl inwardly into relatively loose interlocking engagement as best shown in Fig. 4. Thus the two flanges are interfolded one with the other to produce the loose seam E. This clinching operation takes place while the can and cover revolve around the clinching wheel a distance slightly less than one half the circumference of the wheel. The amount of curling action may be varied as desired and upon completion of the same the clinched can is ready for discharge. To condition the parts for discharge, the chuck 45 is elevated away from the can cover through the action of the cam groove 62 as soon as the described position of clinching termination is reached.

Discharge of the clinched can is effected by a prong 88 which is formed on the starwheel 43 adjacent each pocket 42 in cooperation with a pair of spaced and parallel guide plates 89, 91 which are bolted to the table 18. The guide plate 89 extends inside the path of travel of the cans carried on their spinner plates 25, as best shown in Fig. 6, and hence when a released can comes adjacent this guide plate it is swept off its spinner plate onto the table 18. The prong 88 on the starwheel, engaging behind the can pushes it along the guide plates to any suitable place of deposit.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a mechanism for clinching covers onto cans, the combination of a rotary can supporting member having means for positively rotating the same, separable can holding elements freely rotatable on fixed axes journaled on said member for removably engaging a can and its superimposed cover, means for positioning a can and cover between said holding elements, a clinching wheel journaled adjacent to and eccentrically of said rotating can supporting member, means for positively rotating said clinching wheel, and a universal connection between said clinching wheel and its rotating means for relative movement therebetween, the eccentric rotation of said wheel relative to said holding elements engaging its periphery with the can cover periphery while the cover and its can are bodily revolved with said supporting member to frictionally rotate the can and cover and said holding elements relative to said supporting member for clinching the cover on the can.

2. In a mechanism for clinching covers onto cans, the combination of a fixed frame having a body member rotatably mounted thereon, means for positively rotating said body member, a plurality of spinner plates freely rotatable on fixed axes on said body member for receiving and bodily moving cans with superimposed covers along a circular path of travel, a plurality of chucks freely rotatable upon fixed axes on said body member and respectively disposed in axial alignment with said spinner plate axes for clamping the covers on the cans and for pressing the cans against the spinner plates for rotation of the cans and plates on said aligned axes relative to the positive rotation of the body member, a stationary cam on said fixed frame for imparting relative axial movement between said chucks and spinner plates for removably clamping the cans therebetween, a wheel support mounted on said stationary cam in eccentric relation to the axis of said rotatable body member, a clinching wheel journaled on said support, and means for positively rotating said clinching wheel to engage the same with the peripheries of the superimposed covers while the clamped cans and covers are moved bodily with said rotatable body member to frictionally rotate the cans and covers and clinch the covers onto the cans.

3. In a mechanism for clinching covers onto cans, the combination of a rotary can supporting body member having means for positively rotating the same, separable can holding elements freely rotatable on fixed axes journaled on said member for removably engaging a can and its superimposed cover, means for positioning a can and cover between said holding elements, a clinching wheel journaled on a fixed support disposed in eccentric relation to said body member, means for positively rotating said clinching wheel eccentrically to said body member to engage its periphery with the can cover periphery while the latter and its can are bodily revolved with said body member to frictionally rotate the can and cover and said holding elements relative to said body member to clinch the cover onto the can, a universal connection between said clinching wheel and its rotating means for relative movement therebetween, and means for rotatively adjusting said fixed clinching wheel support relative to said body member to vary the degree of eccentricity of the clinching wheel to obtain corresponding variations in tightness of clinching engagement between cans and their covers.

4. In a mechanism for clinching covers onto cans, the combination of a stationary column having a can support member rotatably mounted thereon, means for positively rotating said member, separable can holding elements freely rotatable on fixed axes journaled on said member for romavably engaging a can and its superimposed cover, means for positioning a can and cover between said holding elements, a clinching wheel journaled on a fixed support disposed adjacent and eccentrically of said can support member, means including a coupling sleeve journaled on said column for positively rotating said clinching wheel in eccentric relation to said can support member to engage the periphery of the wheel with the can cover periphery while the can and cover are bodily revolved with said support member to frictionally rotate the can and cover and said holding elements relative to said can support member to clinch the cover onto the can, and a movable joint connection between said coupling sleeve and said eccentrically mounted clinching

wheel for transmitting the positive rotation of the sleeve to the wheel during relative eccentric movement therebetween.

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