April 12, 1932. C. J. RHODES 1,853,881

MACHINE FOR SIMULTANEOUSLY FLANGING AND DOUBLE SEAMING THE ENDS OF METAL CONTAINERS

Filed Nov. 7, 1929 4 Sheets-Sheet 1

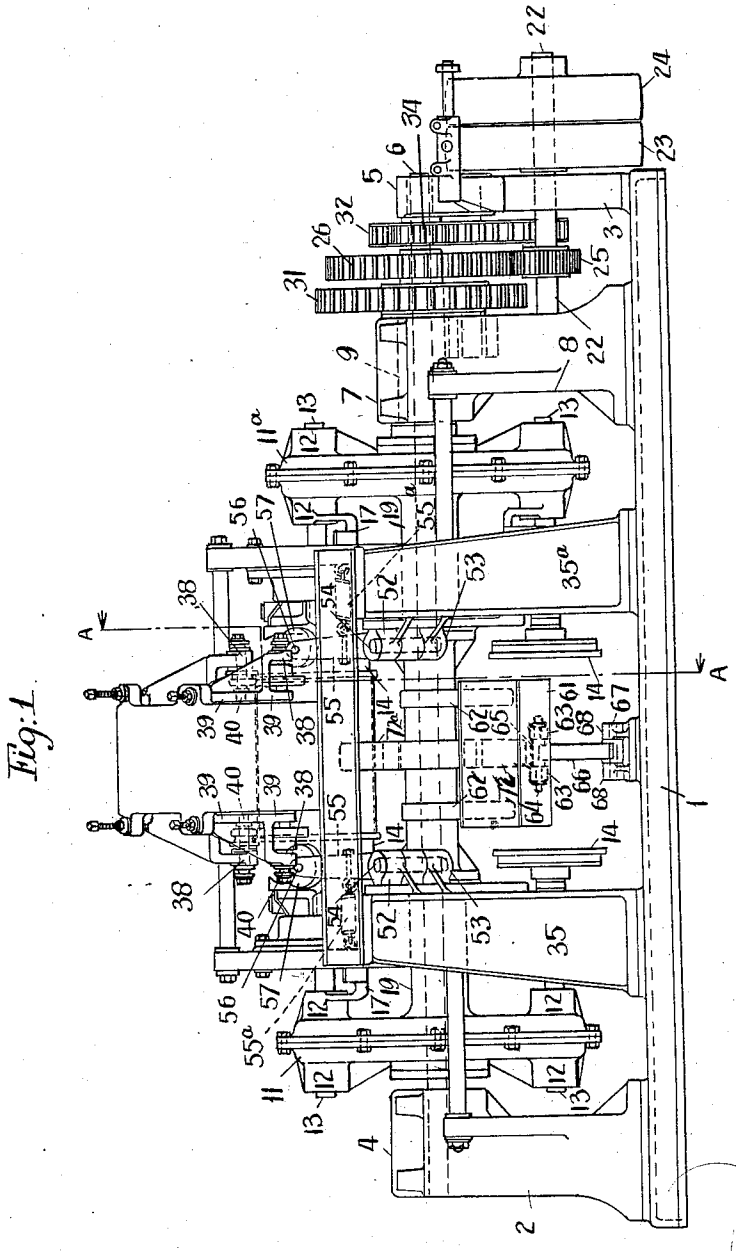

Fig. 1.

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Fig. 2.

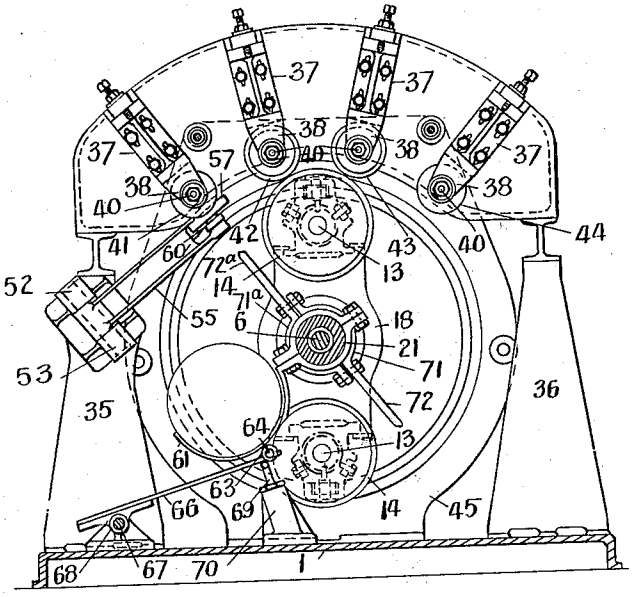
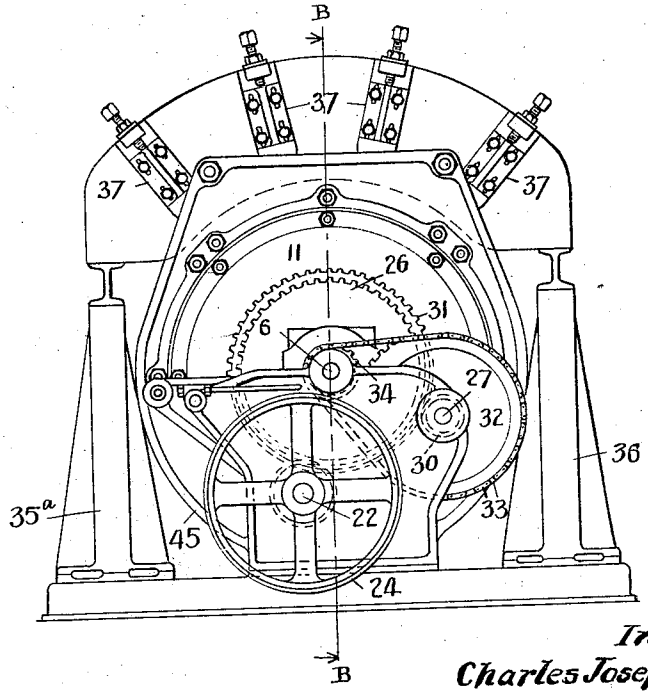


Fig. 3.



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MACHINE FOR SIMULTANEOUSLY FLANGING AND DOUBLE SEAMING THE ENDS OF METAL CONTAINERS

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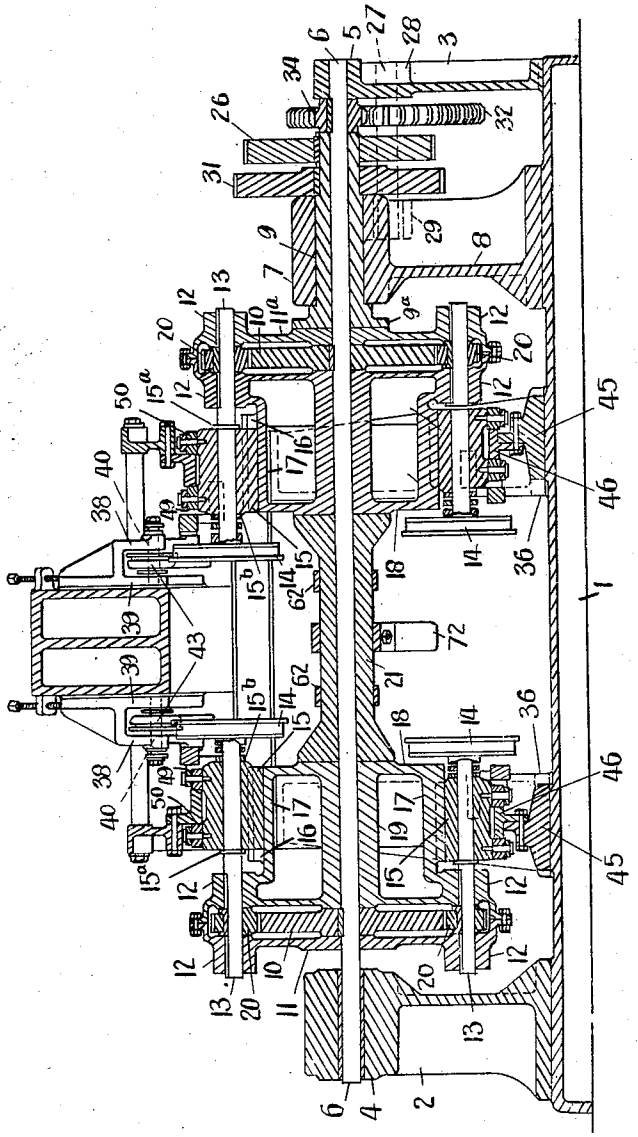
Fig. 4.



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MACHINE FOR SIMULTANEOUSLY FLANGING AND DOUBLE SEAMING THE ENDS OF METAL CONTAINERS

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Fig. 5.

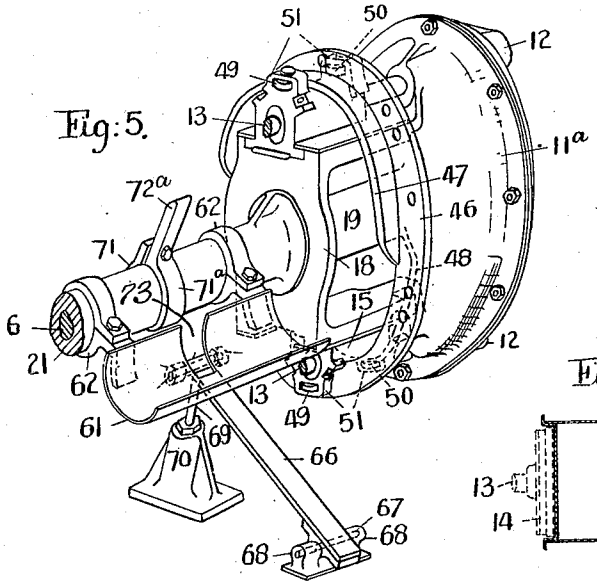


Fig. 7

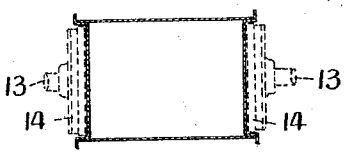


Fig. 6.

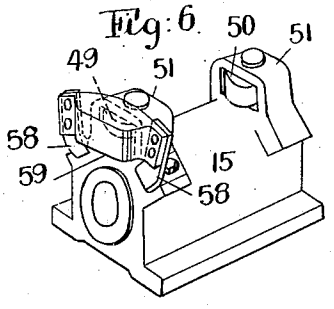
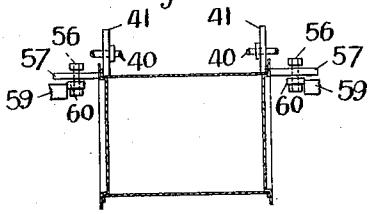


Fig. 8.



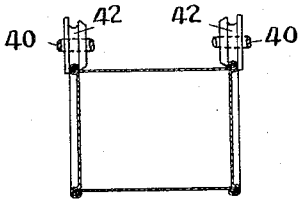


Fig. 9.

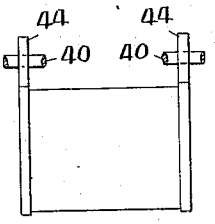


Fig. 10.

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Patented Apr. 12, 1932 1,853,881

UNITED STATES PATENT OFFICE

CHARLES JOSEPH RHODES, OF WAKEFIELD, ENGLAND

MACHINE FOR SIMULTANEOUSLY FLANGING AND DOUBLE SEAMING THE ENDS OF METAL CONTAINERS

Application filed November 7, 1929, Serial No. 405,366, and in Great Britain June 4, 1929.

This invention relates to machines for simultaneously flanging and double seaming the ends of metal containers, and it has for its object certain improvements whereby the desired operations may be effected in a much more rapid and efficient manner than is possible with machines for this purpose as generally constructed.

According to this invention the container is supported by means of chucks which, in the known manner, are inserted in the flanged end closures previously applied to the container. The flanging is effected by means of a roller mounted upon an arm having a radial movement towards and away from the rear face of the chuck, and in a plane at a right angle to the plane of rotation of the said chuck. The arm is spring actuated in one direction and is positively operated against the action of the spring at the desired intervals to cause the roller thereon to act upon the end of the container, a roller is also provided cooperating with the chuck during the flanging operation. Other rollers arranged in a known manner effect the curling and flattening operations.

The invention further provides improved means for presenting the containers to the chucks.

A machine embodying the present invention may conveniently comprise a suitable frame supporting coaxially disposed suitably spaced shafts driven in any suitable manner, each of said shafts at its inner end being provided with a body carrying spindles also arranged in axial alignment and disposed in planes parallel to the axis of the shafts carrying said bodies.

The spindles just referred to are each provided at their inner ends with rotary chucks adapted to engage the end closures of the containers for which purpose the spindles have imparted to them a motion towards the containers, and, on the completion of the operations are withdrawn to free the containers and permit their discharge from the machine.

Pivotally mounted upon the frame of the machine is an arm bifurcated at its free end, and having mounted in said bifurcation a spindle carrying a flanging roller. The arm is spring actuated in one direction, its motion being limited by means of a stop. The spindle of the roller carries a second roller engaging a revolving cam track, the contour of which is such that as the container is moved bodily towards the roller the arm is actuated to cause the flanging roller to come into operation and engage the flanged end closure thereby increasing the width of the previously formed flange in the closure, and at the same time flanging the end of the body of the container.

A second roller is provided upon the frame of the machine disposed at a right angle to the flanging roller, said fixed roller engaging the exterior of the container in the plane of the chuck. The arm carrying the flanging roller is so arranged that the line thereof is tangential to, or substantially tangential to a circle representing the circular path of movement of the container.

The feeding of the bodies of the receptacles to the chucks may be effected by means of a member pivotally mounted at its outer end upon the base plate of the machine, and having at its inner end, rollers which are maintained by the piston rod of a spring actuated piston of a dashpot in contact with a cradle adapted to engage the body of the receptacle at suitable points of its length.

The receptacle is placed by hand in the cradle, and when in position therein the inner end of the pivoted member is engaged by a rotating arm which lifts it together with the cradle and the receptacle therein until the receptacle is in position to be engaged by the chucks. When so engaged, the pivoted member is free of the arm operating it, and under the weight of the parts falls downward, its too rapid descent being checked by the dashpot, and the parts are in position ready to receive the next container.

In order that the invention may be the better understood, drawings are appended showing one form of the invention thereof:—

Fig. 1 is an elevation of a machine embodying the present invention.

Fig. 2 is a transverse section on line A—A Fig. 1.

Fig. 3 is an end view.

Fig. 4 is a longitudinal section on line B—B Fig. 3.

Figs. 5 and 6 are perspective views showing certain details.

Figs. 7, 8, 9 and 10 are views showing the various stages of the process of placing the ends upon a container.

Referring to the accompanying drawings 1 indicates the base of the machine mounted upon which are brackets 2, 3 having formed integral therewith bearings 4, 5 in which is carried a horizontally disposed shaft 6, which extends from end to end of the machine.

Freely mounted upon the shaft 6 and extending through a bearing 7 formed integral with a bracket 8, is a sleeve 9. Disposed at points near each end of the shaft 6, and keyed thereto are pinions 10, 10 disposed within gear boxes 11, 11[a], revolubly mounted upon the said shaft and provided at diametrically opposite points with bearings 12, in which are carried horizontally disposed shafts 13 which extend inwardly of the machine and at their inner ends carry chucks 14, the said shafts 13, being supported at points near their inner ends by means of bearings 15.

The bearings 15, which are arranged to slide in a horizontal plane are carried within channels or recesses 16, formed in bodies 17 extending between and formed integral with the bearings 12, and substantially rectangular shaped plates or bodies 18, formed integral with the inner ends of bosses 19, surrounding the shaft 6 and cast upon the gear boxes 11, 11[a].

Disposed within the gear boxes 11, 11[a] and splined upon the shafts 13 are pinions 20 with which engage the aforementioned pinions 10, the arrangement being such that when motion is transmitted to the shaft 6 in a manner to be hereinafter described, the chucks 14 are caused to revolve.

Mounted upon the shaft 6 and secured at its ends to the bodies 18 is a tubular body or sleeve 21, which in effect serves to rigidly connect the gear box 11, with the gear box 11[a].

The aforementioned sleeve 9 is at its inner end provided with a flange 9[a] by means of which the said sleeve is secured to the gear box 11[a] in order that when motion is transmitted to the sleeve from a main drive shaft 22, provided with fast and loose pulleys 23 and 24, respectively, and a pinion 25, which engages with a pinion 26 keyed to the said sleeve 9, the gear boxes 11, 11[a], are revolved about the shaft 6. 27 indicates a countershaft mounted in bearings 28, 29 carried upon or formed integral with the brackets 3 and 8 respectively and having mounted thereon a pinion 30 with which engages a pinion 31 keyed to the sleeve 9 whereby motion is imparted to the said countershaft.

Keyed upon the countershaft 27 is a sprocket wheel 32 from which motion is imparted to the shaft 6, by means of a chain 33, which passes around the said sprocket wheel 32, and a second sprocket wheel 34, upon the said shaft 6.

Disposed upon either side of the machine and carried upon the upper ends of pairs of standards 35, 35[a] and 36, 36[a], respectively, are horizontally disposed girders between which is supported a substantially arcuate member which extends over the centre of the machine and carries upon each of its sides adjustably mounted brackets 37, each provided at their lower extremities with bearings 38, 39 in which are mounted spindles 40, which carry supporting rollers 41, curling rollers 42, 43 and flattening rollers 44, such as shown in Fig. 2.

45, 45 indicate vertically disposed brackets or frames mounted upon the base of the machine and mounted upon each of which is an annulus 46, provided upon its respective faces with cam surfaces 47 and 48 such as indicated more clearly in Fig. 5, and with which cam faces engage rollers 49, 50 mounted within slotted lugs 51 formed integral with the upper portions of each bearing 15, the arrangement being such that when the gear boxes 11, 11[a] are in motion, the bearings 15 are reciprocated longitudinally of the machine.

In order to cause the shafts 13, to be reciprocated with the bearings 15 the said shafts are provided with collars 15[a], 15[b].

The shape of the cam surfaces 47 and 48 is such that, when the chucks 14, which as will be readily seen from the foregoing description, revolve bodily around the shaft 6, are travelling through a certain portion of their path of rotation about the shaft 6 they are caused to move toward each other to grip the container in the manner shown in Fig. 7, and carry it successively into engagement with the aforementioned rollers 41, 42, 43, and 44, after which the said cam faces cause the chucks to separate and release the said container.

Mounted or formed upon the inner faces of each of the standards 35, 35[a], are lugs 52, 53 which form bearings for spindles 54, upon which are pivotally mounted the outer ends of levers 55, the inner ends of which are bifurcated and carry spindles 56, upon which are mounted flanging rollers 57.

Carried by means of brackets 58 and projecting from the inner face of each of the bearings 15 is a cam 59, and mounted upon each of the spindles 56, in the path of movement of each of the said cams, is a roller 60, the purpose of the cams being to engage with the rollers 60, and cause the levers 55 to be moved against the action of springs 55[a], and toward each other as the container is brought under the edge of the supporting rollers 41, to increase the flange on the end blanks thereof and at the same time form a flange upon

each end of the wall of the said container in the manner shown in Fig. 8.

The container, after passing under the action of flanging rollers 57, is successively moved into engagement with the pairs of curling rollers 42, 43 where it is operated upon in the manner shown in Fig. 9, after which it is moved into engagement with the flattening rollers 44, in the manner shown in Fig. 10.

61 indicates a cradle into which the containers are placed, and in which they are fed to the chucks, the said cradle being carried upon the outer ends of bodies 62, revolubly mounted upon the sleeve 21 as shown more clearly in Fig. 5 in which the said cradle is to be seen in its lowermost postion and resting upon rollers 63, 63, mounted upon a spindle 64 carried by a bearing 65 formed upon the inner end of an inclined lever 66 pivotally mounted at its outer end upon a shaft 67 carried in bearings 68 mounted upon the base 1.

The inner end of the lever 66 is normally supported upon the upper end of a piston rod 69 connected at its lower end to an oil filled dashpot 70. Clamped around the sleeve 21 are semi-circular bodies 71, 71[a], provided with outwardly extending portions or members 72, 72[a], respectively, which project from opposite sides of the said sleeve, and are so designed that when the sleeve is in rotation they successively engage with the inner end of the lever 66.

When one or other of the members 72 or 72[a], engages with the inner end of the lever 66, the said lever is raised, the cradle together with the container therein thus being also raised until a pair of oppositely disposed chucks 14, 14 are moved toward each other and grip the container in the manner previously described.

After the container has been gripped by the chucks, the respective member 72 or 72[a], as the case may be, passes out of contact with the end of the lever 66, and permits the same together with the cradle to return to its lowermost position, the cradle itself being provided with a slot 73 through which the said member passes after moving out of contact with the lever.

Whilst the cradle is being raised, the piston-rod is caused, by means of a spring acting upon the dashpot piston, to rise into its uppermost position, in which position it is ready to subsequently permit the cradle to be eased gently into lowermost position.

Claims:

1. In a machine for simultaneously flanging and double seaming, the ends of metal containers, in combination, means for feeding containers with flanged covers thereon to said machines, means for engaging the covers of said containers for carrying said containers through the machine, means for flanging the ends of the container body and simultaneously increasing the diameter of the cover flanges to extend beyond said body flanges, means for curling the cover flanges inwardly down and over the body flanges, means for flattening the flanges so curled, onto the side end portions of the container bodies, and means for releasing the finished containers for delivery from the machine.

2. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, mechanism for rotatively supporting and moving containers with their flanged closures through the machine, devices engaging the said flanged closures for increasing the width of the previously formed flanges on the closures, and for simultaneously flanging the ends of the body of said container, means for curling the closure flanges over the body flanges and means for flattening the interlocked flanges against the side end portions of the container body.

3. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, mechanism for conveying metal containers and their pre-flanged end closures bodily around a fixed center, means for simultaneously rotating said containers around their own axes, means engaging the flanged closures to impart a rolling inward thrust in a line co-incident with the wall of said containers and rolling means for imparting a rolling thrust substantially co-incident with the walls of said closures, said rolling thrust collectively increasing the width of the pre-formed flange on the said closures and forming flanges on the ends of the container bodies, means for curling the widened closure flanges over the body flanges and means for turning and flattening said interlocked flanges onto the side ends of said container.

4. In a machine of the class described, mechanism for conveying metal containers and their pre-flanged end closures through the machine, means engaging the ends and sides of said containers for widening the preformed flanges on said closures and for simultaneously forming flanges on the ends of the container bodies, means for curling the closure flanges so widened over the body flanges so formed, and means for flattening said interlocked body and closure flanges onto the sides of said container body.

5. In a machine of the class described, chucks for supporting the containers having previously inserted flanged end enclosures, arms swingable towards and away from the rear faces of said chucks and in a plane at right angles to the rotation of said chucks; rollers on the ends of said arms; said arms being spring urged to the inoperative position, and intermittently and positively actuated to cause the rollers thereon to roll on the end enclosures of the container for widen-

ing the closure flanges and for forming flanges on the container bodies; and rollers bearing on the side ends of the flange body and coacting with the rollers on said arms and with the chucks in the flanging operation.

6. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, chucks for engaging the opposite ends of the containers, bodies supporting said chucks, means for rotating said bodies, means for rotating said chucks on said supporting bodies, means for advancing and withdrawing said chucks into and out of engagement with the ends of the containers, levers pivotally mounted to swing in a plane at a right angle to the plane of rotation of said chucks, a flanging roller upon each of said levers having its axis of rotation disposed at a right angle with respect to the axis of rotation of said chucks, means for actuating said levers to bring said flanging rollers into and out of operative engagement with the respective ends of the containers, further rollers designed to cooperate with the flanging rollers and arranged with their axes of rotation at right angles to the axis of rotation of the chucks, curling and flattening rollers fixed with respect to said chucks, and means for feeding the containers to the machine.

7. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, a shaft, means for rotating said shaft, a body upon the shaft, a second body upon the said shaft, said bodies being disposed in suitably spaced relationship, means for rotating said bodies independently of said shaft, bearings slidable upon said bodies, spindles carried by said bearings, pinions on said spindles, pinions upon said first shaft engaged by said pinions, chucks upon said spindles, means for advancing and withdrawing said bearings to bring the chucks into and out of engagement with the ends of the containers, levers pivotally mounted upon the frame of the machine, a flanging roller upon one end of each of said levers, a second roller also upon each of said levers, rotary cams engaging each of said second rollers to actuate the levers to cause the flanging rollers to operate upon the respective ends of the containers, means actuating the levers to remove the flanging rollers from their operative positions, further rollers cooperating with the respective flanging rollers, curling and flattening rollers, and means for feeding the containers to the machine.

8. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, a shaft, means for rotating said shaft, a body upon the shaft, a second body upon the said shaft, said bodies being disposed in suitably spaced relationship, means for rotating said bodies independently of said shaft, bearings slidable upon said bodies, spindles carried by said bearings, pinions on said spindles, pinions upon said first shaft engaged by said pinions, chucks upon said spindles, means for advancing and withdrawing said bearings to bring the chucks into and out of engagement with the ends of the containers, levers pivotally mounted upon the frame of the machine, a flanging roller upon one end of each of said levers, a second roller upon each of said levers, rotary cams engaging each of said second rollers to actuate the levers to cause the flanging rollers to operate upon the respective ends of the containers, means actuating the levers to remove the flanging rollers from their operative positions, fixed rollers cooperating with the respective flanging rollers and disposed in a plane at a right angle to the planes of said flanging rollers, curling and flattening rollers, and means for feeding the containers to the machine.

9. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, a shaft, means for rotating said shaft, a body upon the shaft, a second body upon the shaft, said bodies being disposed in suitably spaced relationship, means for rotating said bodies independently of said shaft, bearings slidable upon said bodies, spindles carried by said bearings, pinions on said spindles, pinions upon said first shaft engaged by said pinions, chucks upon said spindles, means for advancing and withdrawing said bearings to bring the chucks into and out of engagement with the ends of the containers, levers pivotally mounted upon the frame of the machine, a flanging roller upon one end of each of said levers, a second roller upon each of said levers, rotary cams engaging each of said second rollers to actuate the levers to cause the flanging rollers to operate upon the respective ends of the containers, springs acting upon the levers to cause them to remove the flanging rollers from their operative positions, fixed rollers cooperating with the respective flanging rollers and disposing in a plane at a right angle to the planes of said flanging rollers, curling and flattening rollers, and means for feeding the containers to the machine.

10. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, chucks for engaging the opposite ends of the containers, bodies supporting said chucks, means for rotating said bodies, means for rotating said chucks on said supporting bodies, means for advancing and withdrawing said chucks into and out of engagement with the ends of the containers, levers pivotally mounted to swing in a plane at a right angle to the plane of rotation of said chucks, a flanging roller upon each of said levers having its axis of rotation disposed at a right angle with respect to the axis of rotation of said chucks,

means for actuating said levers to bring said flanging rollers into and out of operative engagement with the respective ends of the containers, a second pair of rollers designed to cooperate with the respective flanging rollers and arranged with their axes of rotation at right angles to the axis of rotation of the chucks, curling and flattening rollers fixed with respect to said chucks, and means for feeding the containers to the machine, comprising, a pivotally supported cradle adapted to partially surround the receptacle, a lever pivoted to the base of the machine at its outer end, rollers upon the inner end of said lever engaging said cradle, rotating members for engaging the inner end of said lever to raise the same together with the cradle in order to bring the container into position to be engaged by the chucks, said members moving out of engagement with said lever to permit it and said cradle to return to its normal position, and a buffer for checking the return movement of the cradle.

11. In a machine for simultaneously flanging and double seaming the ends of metal containers, in combination, a shaft, means for rotating said shaft, a body upon the shaft, a second body upon the said shaft, said bodies being disposed in suitably spaced relationship, means for rotating said bodies independently of said shaft, bearings slidable upon said bodies, spindles carried by said bearings, pinions on said spindles, pinions upon said first shaft engaged by said pinions, chucks upon said spindles, means for advancing and withdrawing said bearings to bring the chucks into and out of engagement with the ends of the containers, levers pivotally mounted upon the frame of the machine, a flanging roller upon one end of each of said levers, a second roller also upon each of said levers, rotary cams engaging each of said second rollers to actuate the levers to cause the flanging rollers to operate upon the respective ends of the containers, means actuating the levers to remove the flanging rollers from their operative positions, further rollers cooperating with the respective flanging rollers, curling and flattening rollers, and means for feeding the containers to the machine, comprising, a pivotally supported cradle adapted to partially surround the receptacle, a lever pivoted to the base of the machine at its outer end, rollers upon the inner end of said lever engaging said cradle, rotating members for engaging the inner end of said lever to raise the same together with the cradle in order to bring the container into position to be engaged by the chucks, said members moving out of engagement with said lever to permit it and said cradle to return to its normal position, and a buffer for checking the return movement of the cradle.

12. In a machine of the class described, rotary mechanism having means for conveying metal containers by contact with their pre-flanged end closures in combination with rolling means engaging the flanges of said closures and the side end edges of said containers for widening the flanges on said closures and for forming flanges on the ends of said containers of substantially less than the width of the widened flanges on said end closures, rolling means for curling the closure flanges over the body flanges and simultaneously flattening the said interlocked flanges.

13. A double heading, flanging and seaming machine for containers comprising in combination a hollow revolvable shaft, gear boxes rigid with said shaft and carrying bearings distant from said shaft, spaced aligned shafts journalled in said bearings, a countershaft revolvably mounted in the hollow of said first shaft, gears fixedly mounted on said countershaft and disposed in said boxes, pinions fixedly carried by said aligned shafts and meshing with said gears, chucks mounted on the inner ends of said aligned shafts for holding opposed container heads, between which latter the container bodies are positioned; a stationary member; and rollers of different contour carried by said member at the path of movement of the periphery of said chucks for successively engaging the adjoining head and body portions to flange and seam the same, said aligned shafts with their mountings being revolvable about their axes to cooperate with said rollers.

14. A heading, flanging and seaming machine for containers comprising in combination a hollow revolvable shaft, gear boxes rigid with said shaft and carrying bearings distant from said shaft, pairs of spaced aligned shafts journalled in said bearings, a countershaft revolvably mounted in the hollow of said first shaft, gears fixedly mounted on said countershaft and disposed in said boxes, pinions fixedly carried by said aligned shafts and meshing with said gears, chucks mounted on the inner ends of said aligned shafts at one side of the machine for holding containers at one of their ends, chucks mounted on the inner ends of opposite aligned shafts, for holding heads on the opposite ends of the containers; a stationary arcuate member; and rollers of different contour carried by said member at the path of movement of the periphery of said last mentioned chucks for successively engaging the adjoining container end and head portions to flange and seam the same, said aligned shafts with their mountings being revolvable about their axes to cooperate with said rollers.

In testimony whereof I have hereunto set my hand.

CHARLES JOSEPH RHODES.