Oct. 17, 1939. N. R. BECK 2,176,241

LEHR FEEDER

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Fig. 1.

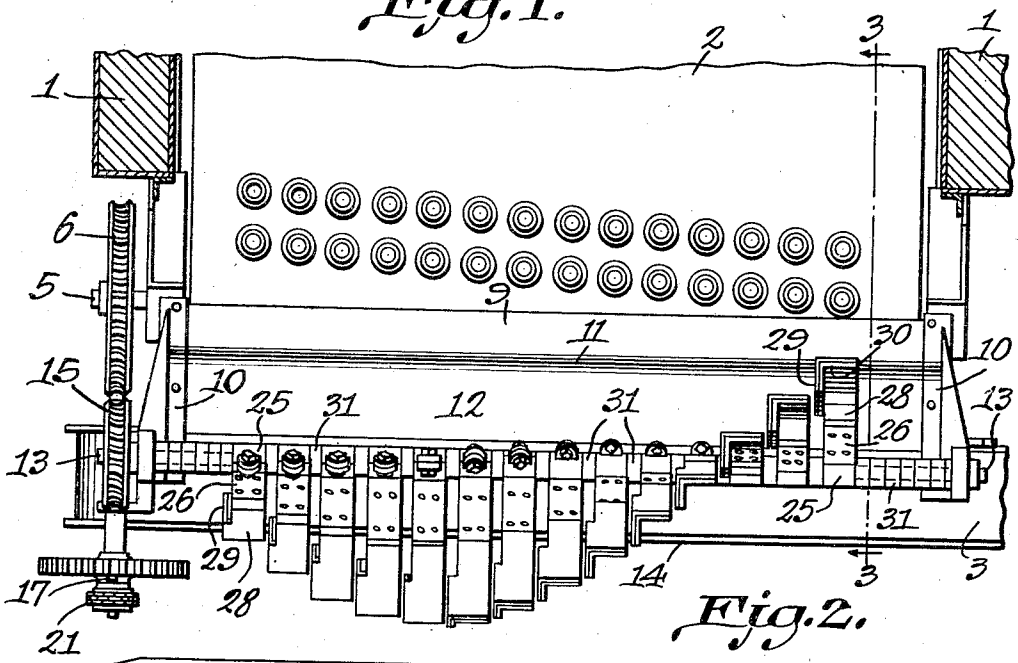
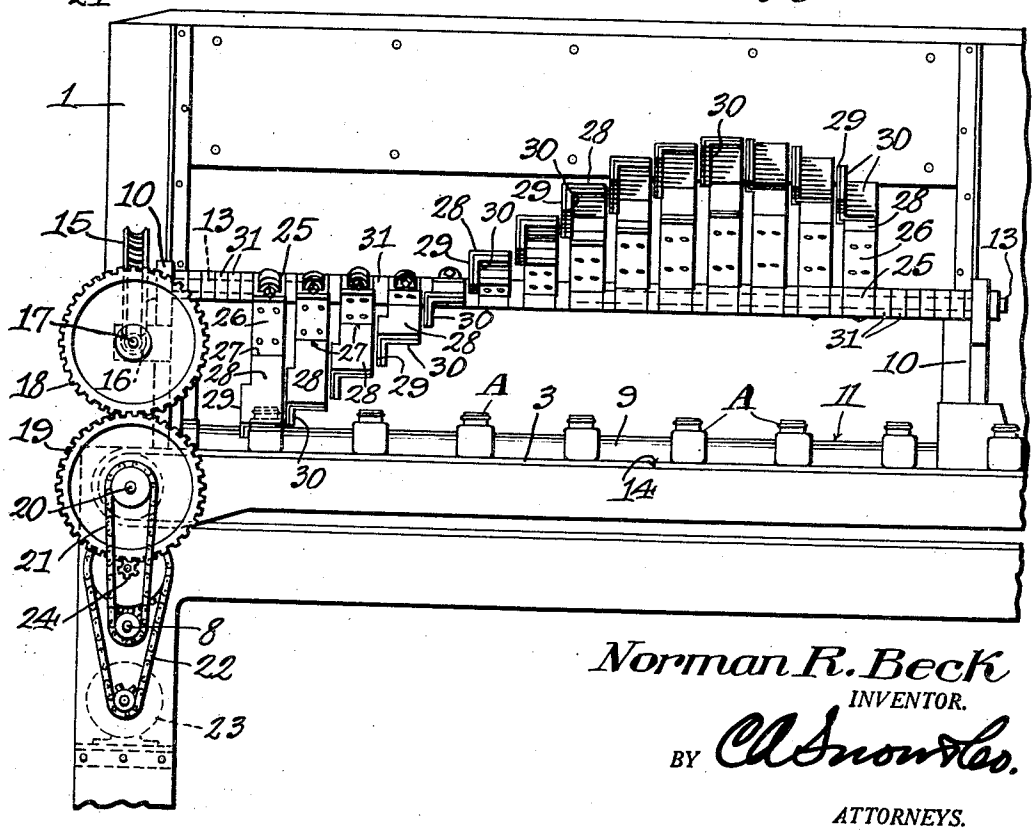


Fig. 2.



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LEHR FEEDER

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Fig. 3.

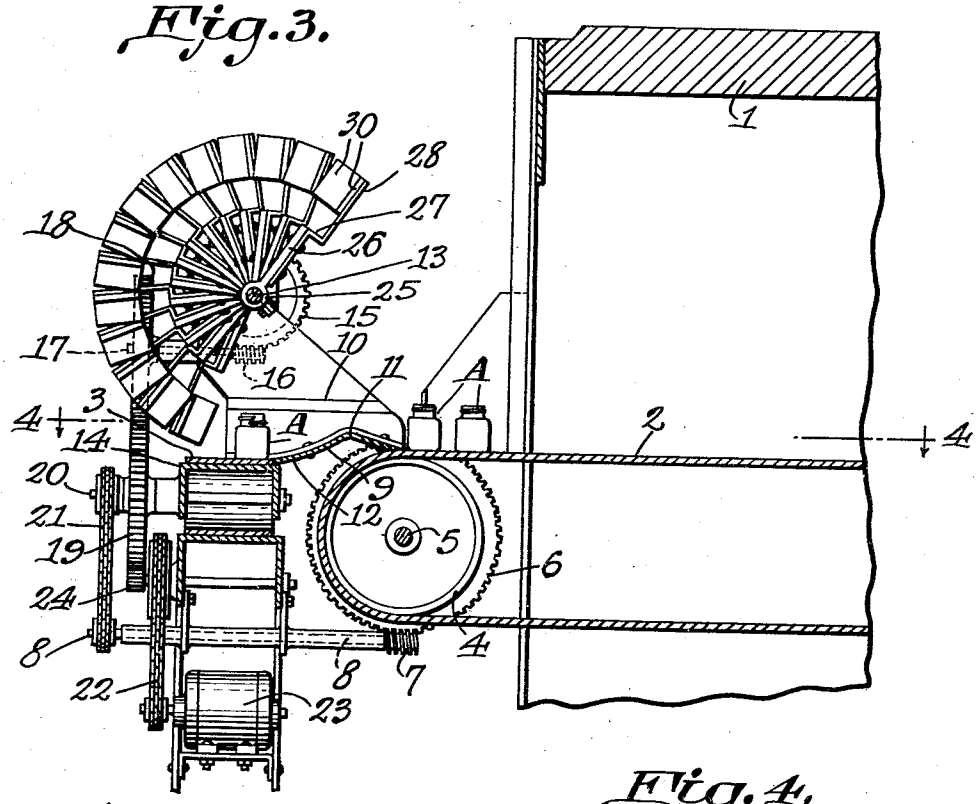
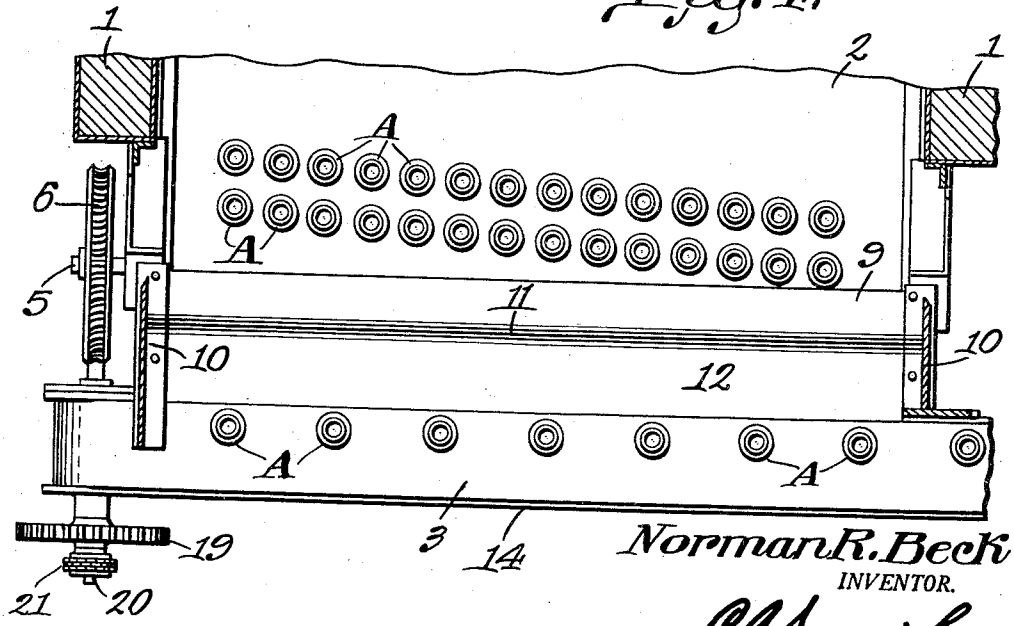


Fig. 4.



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LEHR FEEDER

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Fig. 5.

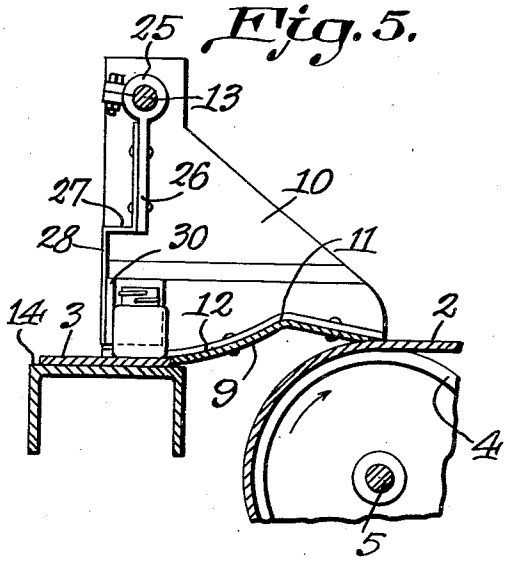


Fig. 6.

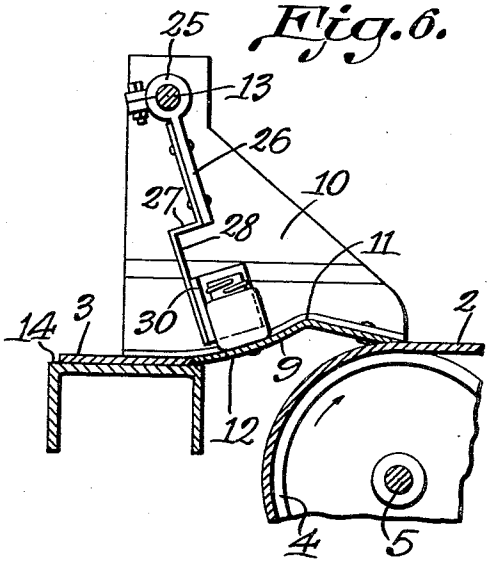


Fig. 7.

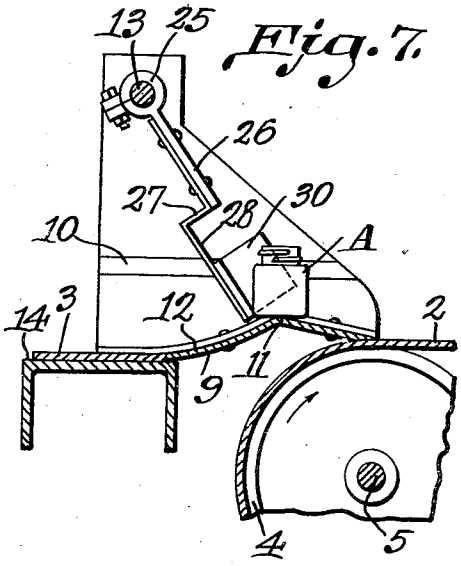
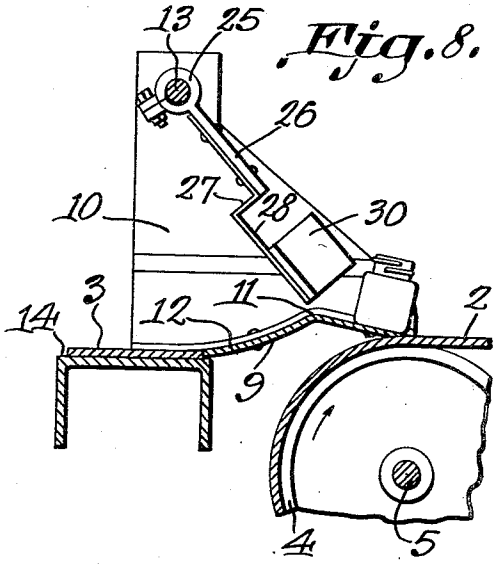


Fig. 8.



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LEHR FEEDER

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Fig. 11.

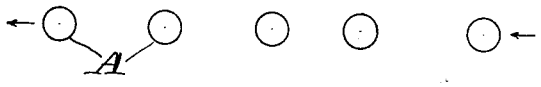


Fig. 12.

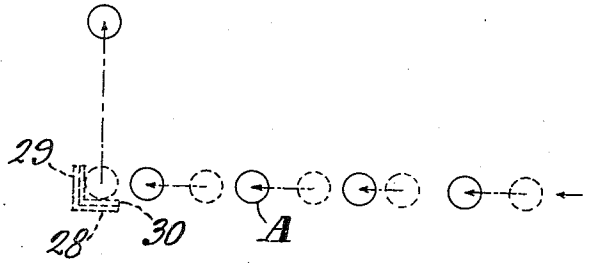


Fig. 13.

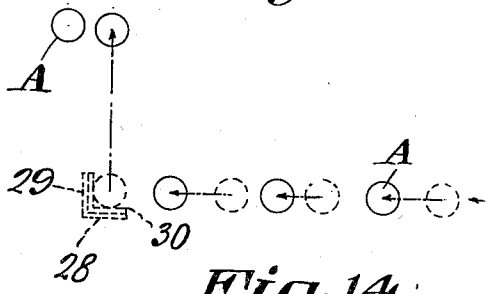


Fig. 14.

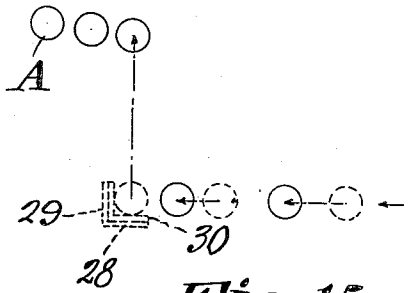


Fig. 15.

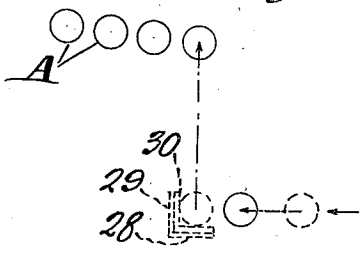


Fig. 9.

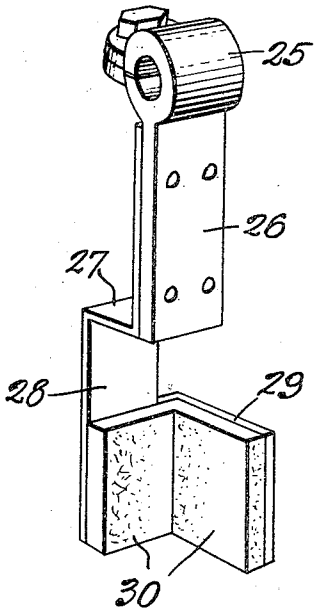
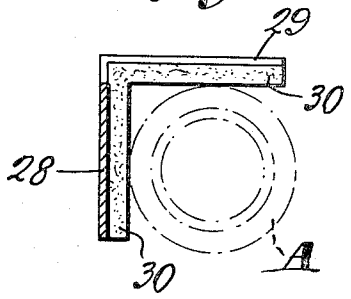


Fig. 10.



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Patented Oct. 17, 1939

2,176,241

UNITED STATES PATENT OFFICE

2,176,241

LEHR FEEDER

Norman R. Beck, Baltimore, Md., assignor to Carr-Lowrey Glass Co., Baltimore, Md.

Application June 10, 1938, Serial No. 213,047

6 Claims. (Cl. 198—31)

This invention relates to means for feeding newly formed glassware into a lehr.

Bottles and similar glassware must be subjected to a slow cooling or annealing process, as is well known to those skilled in the art. Immediately following the shaping of the articles of glassware, it has been the practice usually to place them by hand on a conveyor moving at a low speed within the lehr. This method of handling has added considerably to the cost of production and under present practice, where the bottles are produced automatically and at high speed, the positioning of the articles in the lehr has become a constantly increasing problem.

An object of the present invention is to provide a new and novel form of feeder to which the formed articles of glassware are supplied automatically as delivered from the forming machines and are transferred successively onto the conveyer of the lehr where they are arranged in spaced rows, the articles in each row being located close together but out of contact.

It is a further object to provide a feeder which will not only transfer the formed articles to the lehr conveyer but will also rearrange the articles relative to one another so that they will be properly positioned on the lehr conveyer irrespective of their relative positions when supplied to the feeder.

A still further object is to provide a feeder or transfer means which rotates continuously during its operation, the construction of the feeder being such that during the completion of each rotation, one row of formed articles will be set up on the lehr conveyer and the feeder brought to position for repeating the operation of setting up another row.

A further object is to provide a feeder the transfer elements of which can be adjusted relative to each other whereby the feeder can be adapted for use with different kinds and sizes of glassware.

Another object is to provide a drive mechanism which operates the feeder and the lehr conveyer in properly timed relation to insure proper spacing of the rows of articles set up on the conveyer by the feeder.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings

Figure 1 is a plan view of the feeder and adjacent portions of the feed conveyer and lehr conveyer, portions of the lehr being shown in section.

Figure 2 is a front elevation of the feeder and adjacent parts.

Figure 3 is a section on line 3—3, Figure 1.

Figure 4 is a section on line 4—4, Figure 3.

Figure 5 is a vertical section through a portion of the apparatus showing one sweep of the feeder at the beginning of the operation of transferring an article of glassware from the feed belt to the lehr conveyer.

Figure 6 is a similar view showing the unchanged relative positions of the sweep and the article to be annealed, the parts being shown during the initial portion of the transfer operation.

Figure 7 is a similar view showing the relative positions of the sweep and formed article at the beginning of the gravitation of said article away from the sweep and toward the lehr conveyer.

Figure 8 is a view similar to Figure 7 showing the formed article clear of the sweep and about to slide into engagement with the lehr conveyer.

Figure 9 is a perspective view of one of the sweeps.

Figure 10 is a transverse section through the sweep and showing, by broken lines, an article of glassware engaged thereby.

Figure 11 is a view in diagram showing a row of formed glass articles as they might appear on the feed belt while approaching the feeder.

Figure 12 shows the relative positions of the same articles following the transfer of one of them by the feeder.

Figure 13 is a similar view showing the relative positions of the formed articles following the transfer of the second article.

Figure 14 is a similar view showing the relative positions of the articles following the transfer of the third one.

Figure 15 is a similar view showing the relative positions of the articles following the transfer of the fourth one.

Referring to the figures by characters of reference, 1 designates a portion of a lehr in which is located a conveyer 2 of the usual construction adapted to travel at a low speed longitudinally of the lehr and away from a feeding belt 3 which

is extended across the inlet end of the lehr and is designed to supply hot formed glass articles to the lehr as they are delivered from the glass machines.

The lehr conveyer 2 is extended outwardly from the lehr at the front end thereof as clearly shown in Figures 1 and 3, this outer portion being mounted on a roll 4 the shaft 5 of which is adapted to be driven by any suitable mechanism. For example a gear 6 can be secured to the shaft and receives motion from a worm 7 rotatable with a shaft 8.

An apron 9 bridges the space between belt 3 and conveyer 2, this apron being in the form of a metal plate one edge of which is located close to and at one side of the belt 3 while the other or opposed edge overlies and is close to the top surface of the conveyer 2. This apron can be supported between and by frame members 10 located adjacent to the sides of the lehr and the apron is so shaped that an intermediate ridge or peak 11 extends longitudinally thereof, that portion of the apron at one side of this ridge being inclined downwardly toward the conveyer 2 while the remaining portion of the apron is curved downwardly toward the adjacent side of the belt 3, the curvature of this portion 12 being such as to lie concentric with the shaft 13 of the feeder. This shaft is journalled in the frame members 10 above and substantially parallel with the belt 3.

Belt 3 is adapted to travel on a supporting plate 14 so as to be prevented from sagging under the weight carried thereby and this belt, together with any other belt found desirable for conveying formed articles of glassware from one or more glass machines, is adapted to bring the formed glass articles into position close to and in front of the arcuate portion 12 of apron 9 as shown, for example, in Figures 3 and 4, wherein the formed articles have been indicated at A.

Any suitable means may be provided for driving belt 3, conveyer 2 and shaft 13 in properly timed relation. For example a gear 15 secured to feeder shaft 13, can receive motion from a worm 16 carried by a shaft 17. This shaft, in turn, can be driven by gears 18 and 19 from shaft 20 of belt 3. Chain and sprocket mechanism indicated generally at 21 can be used for transmitting motion between shafts 8 and 20 and additional chain and sprocket mechanism 22 can be employed for transmitting motion from a motor 23 to a gear 24 used for driving one of the gears 18.

It is to be understood that other mechanisms could be used for causing belt 3, conveyer 2, and shaft 13 to operate at the desired relative speed.

The feeder per se, includes a series of sweeps arranged spirally on shaft 13 so as to rotate therewith, these sweeps being extended through approximately one-half the circumference of a circle about the shaft while an annular gap occupies the remainder of the circle as shown in Figure 3. Each sweep includes a sleeve 25 which can be split as shown in Figure 9 and clamped to the shaft so as to move therewith. From each sleeve is extended an arm 26 having an offset portion 27 providing a blade 28 with a side wing 29 extending therefrom in the direction of movement of the sweep. The advancing surface of blade 28 and the adjoining side surface of the wing 29 has a lining of asbestos or any other suitable material indicated generally at 30 for direct contact with the hot article of glassware to be transferred from the feed belt to the lehr conveyer. Wing 29 is adapted to move into the path of the glassware articles A so as to constitute a stop or gage therefor while the sweep is advancing to thrust the article off of the belt and into the lehr as hereinafter explained.

Any suitable means can be employed for holding the sweeps properly spaced apart. For example spacing collars 31 can be mounted on the shaft between the sweeps. Furthermore the angles of the sweeps relative to each other can be varied as desired, it merely being necessary to loosen the split sleeve, adjust the sweeps to the proper angles, and then tighten the sleeves so that they will grip the shaft.

If the width of the lehr conveyer is such as to permit fourteen articles of glassware to be arranged in a row thereacross without contacting one with the other, fourteen sweeps will be mounted on the shaft within an angle of 180°.

The drive mechanism is so timed that, if fourteen articles are to be transferred during a one-half revolution of the shaft 13 and the sweeps thereon, the speed of the belt 3 will be such as to bring the fifteenth article of glassware through the gap in the series of sweeps and across the end of the lehr into position to be engaged by the first sweep of the spiral series as it commences its next complete rotation. This speed will also be such that, immediately following the displacement of the first article of glassware by the first sweep, the second article of glassware will have been moved into position in the path of the second sweep, this action continuing throughout the operation of the apparatus.

As the hot articles of formed glassware move to position in front of the lehr and into the paths of the respective sweeps, they are brought successively into contact with the respective stop wings which thus serve to limit the travel of the glassware with the belt immediately following which the blade portion of said sweep comes in contact with the article of glassware, as shown in Figure 5 and forces it laterally off of belt 3 and onto the arcuate portion 12 of the apron 9. As this arcuate portion is concentric with shaft 13, there will be no relative sliding movement of the lining 30 and the article of glassware and, consequently, the surface of the glassware will not be scarred or otherwise marred by contact with the lining. This movement of the glassware under the pushing action of the sweep will continue until the article of glassware is brought to the peak or ridge 11, as in Figure 7, at which time the glass article A will tilt forwardly out of contact with the sweep and gravitate along the remaining portion of the apron until the advancing edge of the bottom of the article contacts with conveyer 2. As this conveyer is moving in the direction indicated by the arrows, it will pull the engaged article thereonto so as to be placed in position to form one of a row of articles.

In Figures 11 to 15 inclusive diagrams have been used to illustrate how the successive articles of glassware moving with the belt 3 are transferred from the belt successively and placed in a row on the conveyer, the alined articles on the conveyer being brought closer together than they were on the belt and being regularly spaced even though, as shown in these figures, they may be irregularly spaced on the belt.

Obviously the driving mechanism of the conveyer 2 must be such that said conveyer, during the placement of one row of articles thereon, will move forward very slowly a distance slightly

greater than the diameter of one of the articles so that after the last article of each row has been placed in position on the conveyer, the first article in the next succeeding row can be placed properly on said conveyer without coming in contact with one of the articles previously placed.

Naturally by providing a feeder such as herein described, the feeding operation is continuous due to the rotary motion of all of the parts and by properly timing the mechanism and adjusting the sweeps, articles of glassware travelling at any predetermined speed and in any predetermined number per minute can be handled automatically and fed properly into the lehr.

What is claimed is:

1. The combination with a lehr having an inlet, of a rotatable series of spirally arranged regularly spaced sweeps supported across the inlet, said series being extended partly around the axis of rotation thereof to provide an annular gap between the ends of the series, a feed belt for supporting hot glass articles in spaced relation and conveying them in a row through the gap in the series of sweeps to position the articles successively in the paths of the respective sweeps, means for rotating the sweeps to push the respective articles from the row on the belt successively into the inlet, and means for guiding the articles during said sweeping operation to prevent relative movement between the articles and the sweeping elements while contacting therewith, said means including a structure extending from one side of the belt and concentric with the axis of rotation of the sweeps, said concentric surface terminating in a ridge at the upper end of said surface providing a fulcrum on which the pushed articles will tilt by gravity away from the sweeps.

2. The combination with a lehr having an inlet and a belt for positioning a series of hot glass articles in a row across the inlet, of means for guiding the articles from the belt to the inlet, said means including a ridge above the level of the belt and surfaces diverging downwardly from said ridge to the belt and inlet respectively, and separate means rotatable about a common axis for transferring articles successively from the row on the belt over one of said surfaces to the ridge for gravitation from the ridge to the inlet, said ridge constituting a fulcrum on which each article will tilt while moving over the ridge, said transferring means including a series of spirally arranged sweeping elements movable transversely of the belt and guiding means, said series extending partly around the axis of rotation to provide an annular gap between the ends of the series, said surface of the guiding means between the belt and the ridge being concentric with said axis of movement of the sweep.

3. The combination with a lehr having an inlet and a feed belt for conveying spaced hot glass articles in a row to position across the inlet, of a shaft above and parallel with the belt, a guide concentric with the shaft and extending from one side of the belt upwardly toward the inlet, said guide terminating in a ridge parallel with the belt, said guide including a surface inclined downwardly from the ridge toward the inlet, and a series of spirally arranged sweeps secured to and rotatable with the shaft, said sweeps being positioned for successive engagement with the articles in a row on the belt and for moving them along the arcuate guide to the ridge, said ridge constituting a fulcrum on which the articles will tilt away from their sweeps.

4. The combination with a lehr having an inlet and a feed belt for conveying spaced hot glass articles in a row to position across the inlet, of a shaft above and parallel with the belt, a guide concentric with the shaft and extending from one side of the belt upwardly toward the inlet, said guide terminating in a ridge parallel with the belt, said guiding including a surface inclined downwardly from the ridge toward the inlet, and a series of spirally arranged sweeps secured to and rotatable with the shaft, said sweeps being positioned for successive engagement with the articles in a row on the belt and for moving them along the arcuate guide to the ridge, said ridge constituting a fulcrum on which the articles will tilt away from their sweeps, and a means for holding the sweep to the shaft for relative lateral and angular adjustment.

5. The combination with a lehr having an inlet and a feed belt for conveying spaced hot glass articles in a row to position across the inlet, of a shaft above and parallel with the belt, a guide concentric with the shaft and extending from one side of the belt upwardly toward the inlet, said guide terminating in a ridge parallel with the belt, said guide including a surface inclined downwardly from the ridge toward the inlet, and a series of spirally arranged sweeps secured to and rotatable with the shaft, said sweeps being positioned for successive engagement with the articles in a row on the belt and for moving them along the arcuate guide to the ridge, said ridge constituting a fulcrum on which the articles will tilt away from their sweeps, each sweep including an article pushing blade and a stop at one side of the blade extending in the direction of movement of the sweep, said arcuate portion of the guide cooperating with the sweep for holding the engaged articles against movement relative to the blade of its sweep during the travel of the article along the arcuate surface.

6. The combination with a lehr having an inlet, of a shaft extending across the inlet and mounted for rotation, a feed belt movable under the shaft and across the inlet and constituting means for directing a row of spaced hot glass articles into position across the inlet and under the shaft, a spirally arranged series of sweeps mounted on and rotatable with the shaft, each sweep having an offset blade constituting means for moving into position parallel with and engaging a surface of an article on the belt and for shifting the article from the belt toward the inlet, and a guard for supporting the article while moving from the belt toward the inlet, said guide including a ridge above the level of the belt and diverging surfaces extending from the ridge toward the belt and the inlet respectively, that surface extended toward the belt being concentric with the axis of rotation of the shaft and cooperating with the sweeps for holding the supported articles against movement relative to the sweeps while travelling from the belt to the ridge, said ridge constituting a fulcrum on which the articles will tilt away from the sweeps when thrust past their centers of gravity on the ridge.

NORMAN R. BECK.