Dec. 11, 1934. A. W. BEESON ET AL 1,983,593

LEER LOADER

Filed May 21, 1931 4 Sheets-Sheet 1

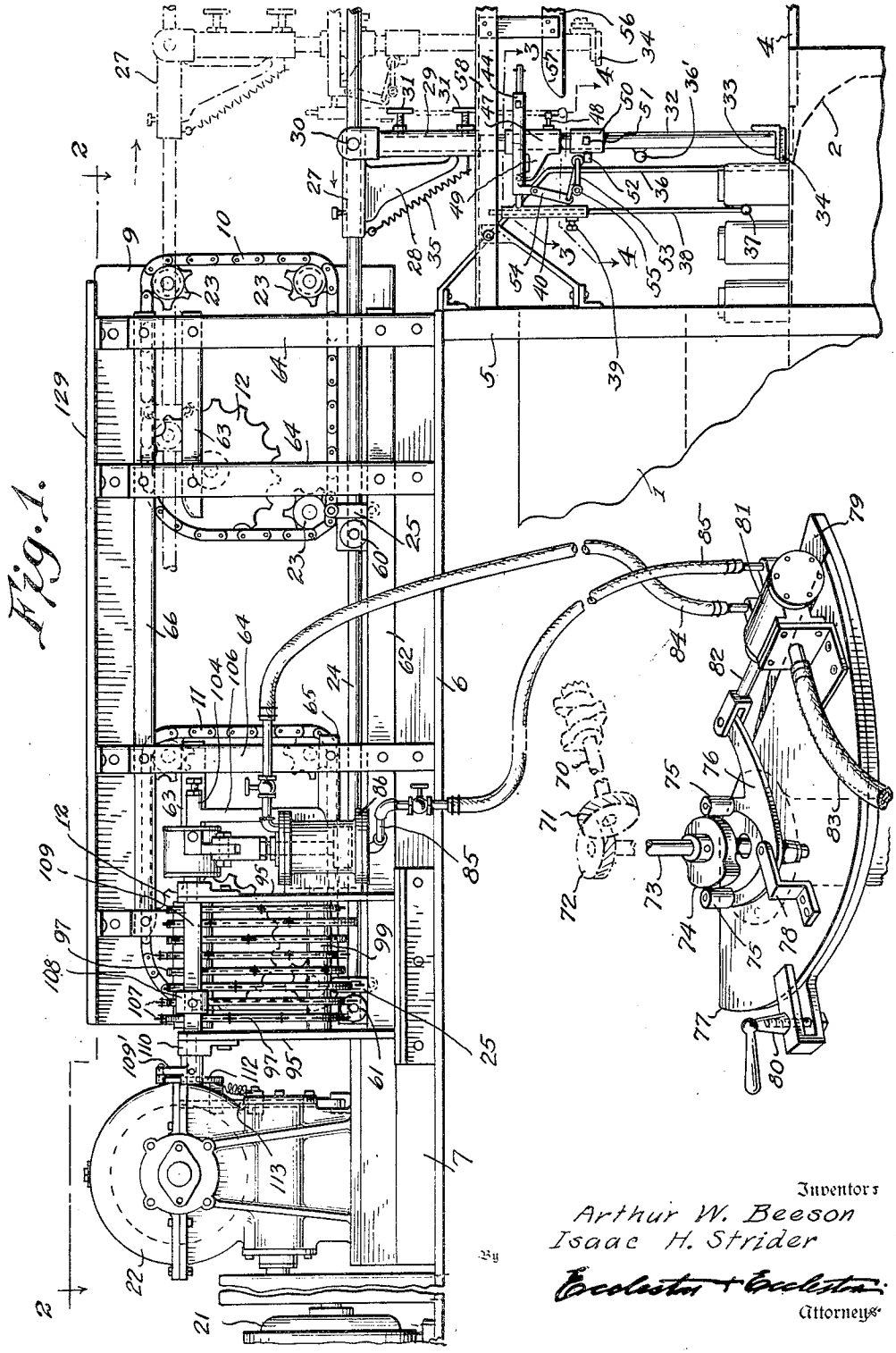


Fig. 1.

Inventors
Arthur W. Beeson
Isaac H. Strider
By Eccleston & Eccleston
Attorneys

Dec. 11, 1934. A. W. BEESON ET AL 1,983,593

LEER LOADER

Filed May 21, 1931 4 Sheets-Sheet 2

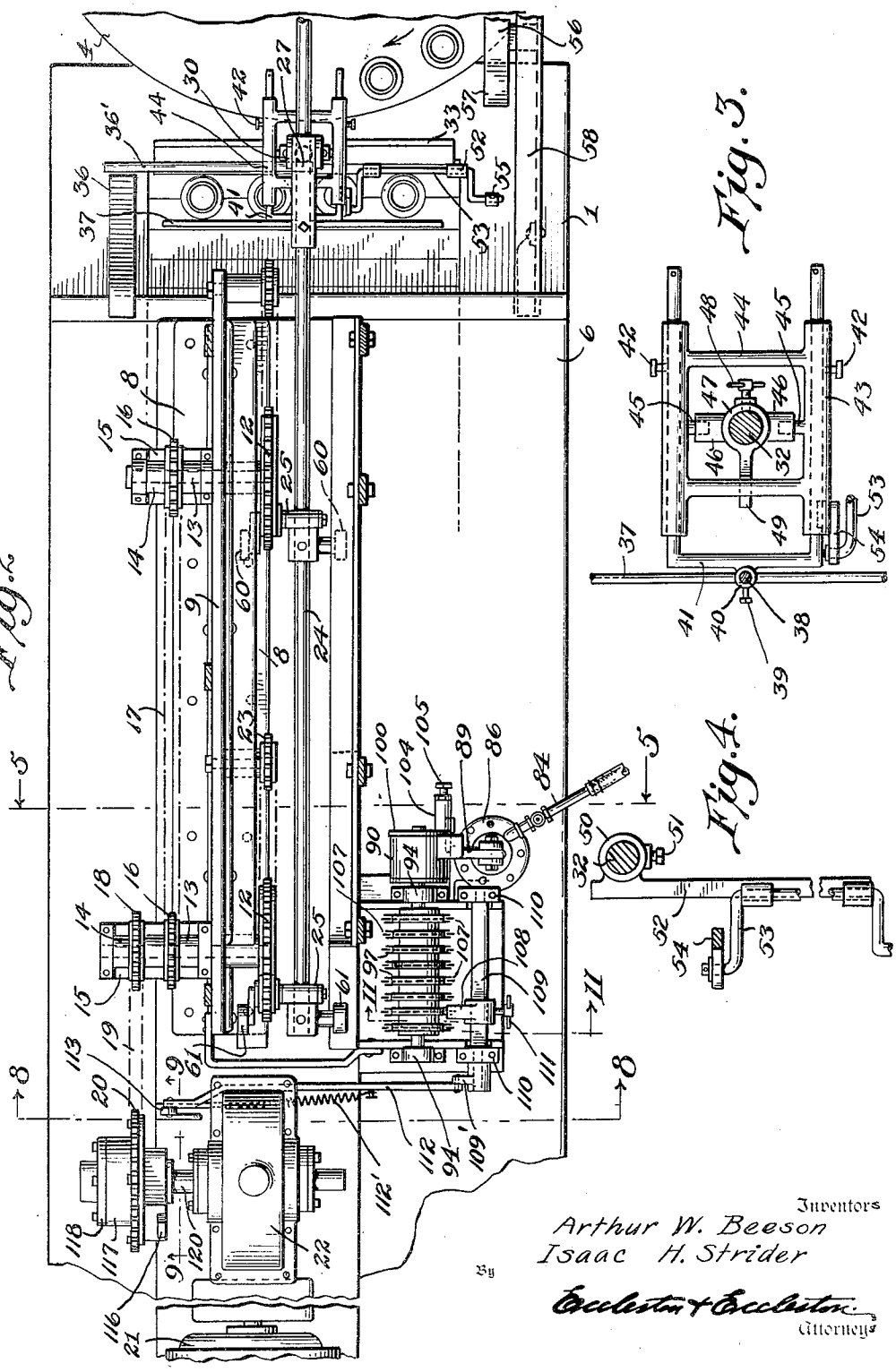


Fig. 2.

Fig. 3.

Fig. 4.

Inventors
Arthur W. Beeson
Isaac H. Strider

By Eccleston & Eccleston
Attorneys

Dec. 11, 1934. A. W. BEESON ET AL 1,983,593

LEER LOADER

Filed May 21, 1931 4 Sheets-Sheet 3

Fig. 5.

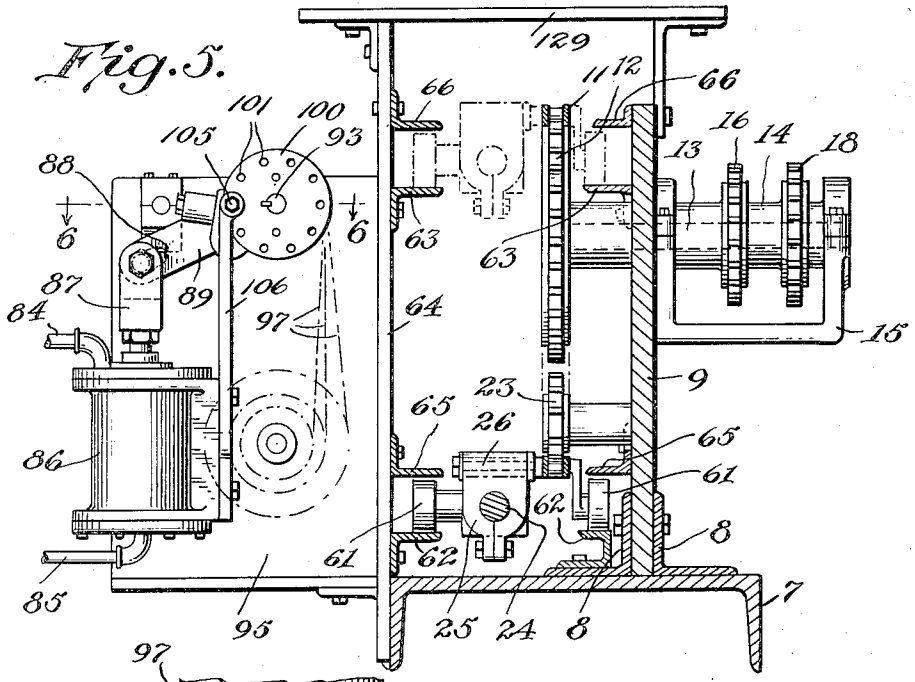


Fig. 6.

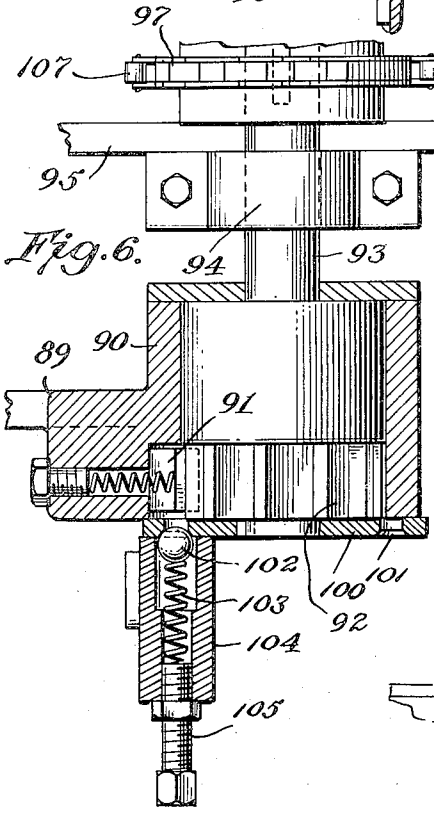
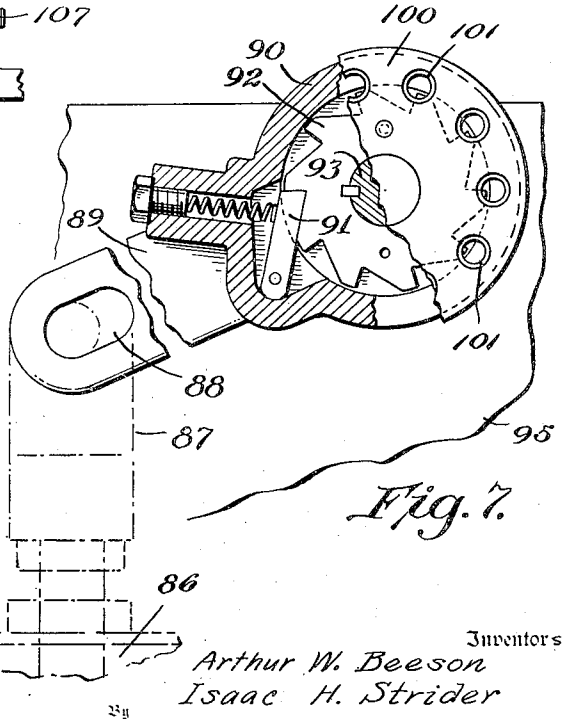


Fig. 7.



Inventors
Arthur W. Beeson
Isaac H. Strider
By
Attorneys

Dec. 11, 1934. A. W. BEESON ET AL 1,983,593

LEER LOADER

Filed May 21, 1931 4 Sheets-Sheet 4

Fig. 8.

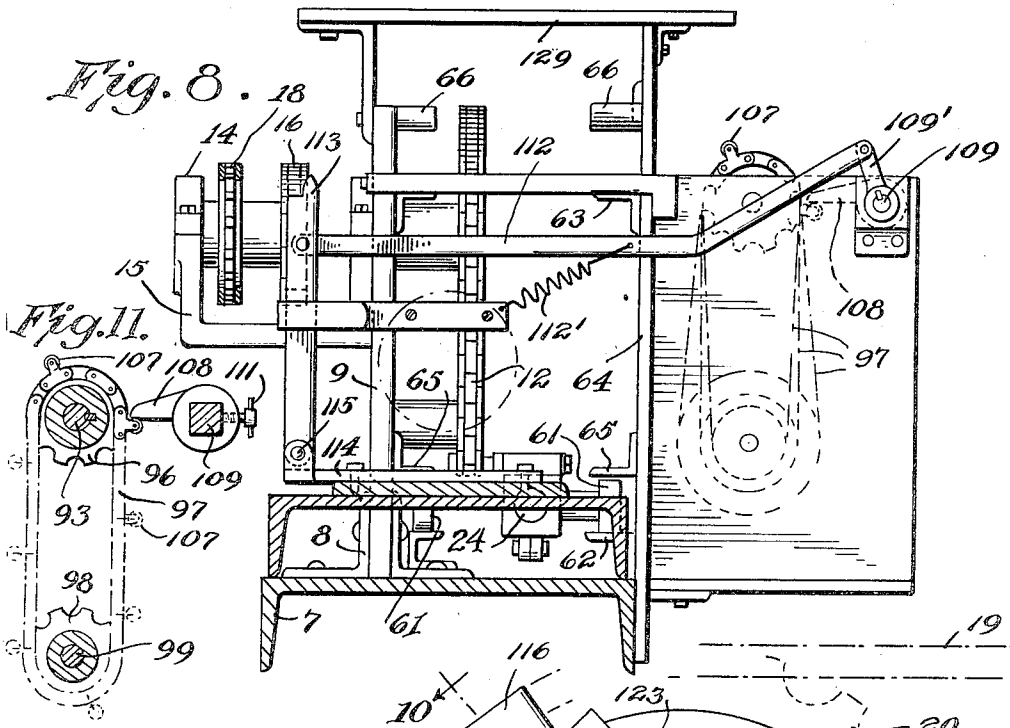


Fig. 11.

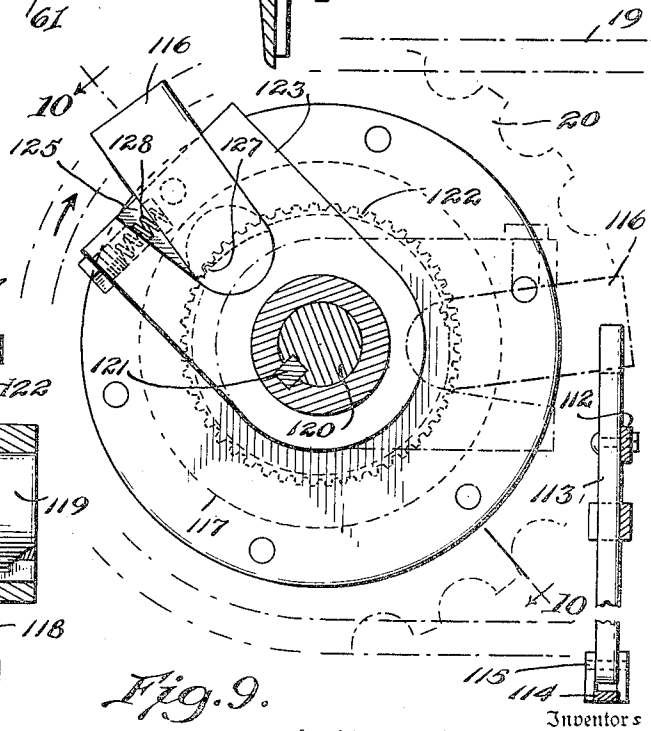
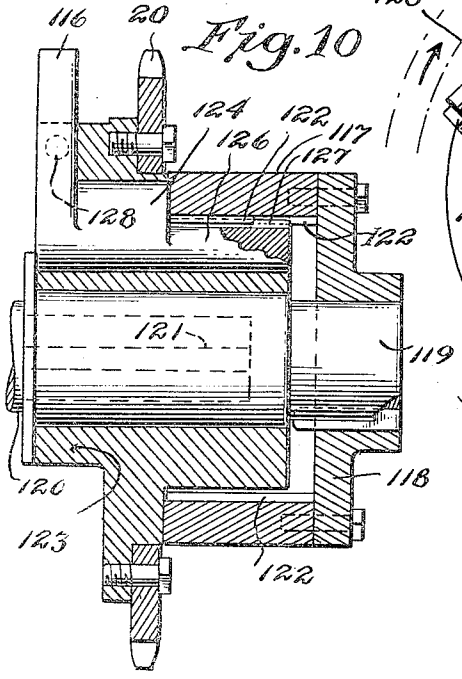


Fig. 9.

Fig. 10



Inventors
Arthur W. Beeson
Isaac H. Strider
By Eccleston & Eccleston
Attorneys

Patented Dec. 11, 1934 1,983,593

UNITED STATES PATENT OFFICE

1,983,593

LEER LOADER

Arthur W. Beeson and Isaac H. Strider, Washington, Pa., assignors to Hazel-Atlas Glass Co., Wheeling, W. Va., a corporation of West Virginia

Application May 21, 1931, Serial No. 539,088

14 Claims. (Cl. 198—31)

This invention relates to loaders for use with leers for annealing glassware, and is of the general type in which a pusher bar is caused to engage a line of ware coming from the forming machine and push the same onto the front end of the leer conveyer.

One of the primary objects of the present invention resides in the provision of a pusher bar and operating means therefor, such that the movements of the pusher bar with respect to the movement of the line of ware across the front of the leer may be easily and simply altered so as to provide proper synchronization between these movements.

Another object of the invention is to provide a timing mechanism for controlling the operation of the pusher bar, the timing mechanism being controlled by the cam shaft of the forming machine and being variable so as to operate the pusher bar when a particular number of articles have been formed, depending upon the width of the articles.

A further object of the invention is to provide an improved mechanism for reciprocating the pusher bar, and for preventing interference with oncoming ware from the forming machine.

Still another object of the invention is to provide an improved ware-steadying device for cooperation with the pusher bar.

A further object of the invention resides in the construction of a leer loader which is mounted in its entirety on top of the leer.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which

Figure 1 is a fragmentary side elevational view of a leer with the complete leer loading apparatus mounted on top thereof, and showing certain positions of the parts in dotted lines.

Figure 2 is a horizontal sectional view taken on line 2—2 of Figure 1.

Figures 3 and 4 are detail sectional views taken on lines 3—3 and 4—4 of Figure 1.

Figure 5 is a vertical sectional view taken on line 5—5 of Figure 2.

Figure 6 is a horizontal sectional view taken on line 6—6 of Figure 5.

Figure 7 is a detail view, partly in section, of a pawl and ratchet mechanism for controlling the operation of the leer loader.

Figure 8 is a vertical sectional view taken on line 8—8 of Figure 2.

Figure 9 is a sectional view taken on line 9—9 of Figure 2.

Figure 10 is a similar view taken on line 10—10 of Figure 9; and

Figure 11 is a sectional view taken on line 11—11 of Figure 2.

Referring to the drawings in more detail, the numeral 1 indicates a glass annealing leer provided with a continuous conveyer 2, a shadow pan 3, and a rotatable table 4 for transporting the ware from the forming machine across the front of the leer.

Corner posts 5 of the leer extend upwardly above the top of the leer and provide supports for a platform 6 on which an inverted channel bar 7 is supported. Mounted on this bar as by means of angle irons 8 is a vertically disposed plate 9 which supports the major portion of the operating mechanism for the leer loader.

Endless sprocket chains 10 and 11 are mounted on the plate 9 and are spaced longitudinally thereof as indicated in Figure 1. These chains are driven by sprocket wheels 12 mounted on shafts 13 extending through plate 9. Shafts 13 are supported in bearings 14 which are carried by brackets 15 mounted on the plate 9. Shafts 13 are also provided with sprocket wheels 16 meshing with a chain 17 which causes the shafts to be driven in unison. The shaft 13 remote from the front of the leer is also provided with a sprocket wheel 18 meshing with a sprocket chain 19 driven by a sprocket wheel 20. This wheel, as will appear hereinafter, is driven intermittently through a motor 21 and reduction gearing 22.

The sprocket chains 10 and 11 are intended to travel in substantially rectangular paths, and to this end each chain travels over three idling sprocket wheels 23, which with wheel 12, provide the four corners of the path of travel of the chains. These chains provide the support and operating means for a rod 24, which latter has clamped thereto two bearing members 25. Shafts 26 are mounted in bearings 25 and each has one end anchored to a corresponding link of the sprocket chains 10 and 11. It will be apparent, therefore, that as the chains 10 and 11 are driven by the sprocket wheels 12 the rod 24 will be moved in a closed path. Considering Figure 1, the rod 24 is about to be raised to its upper position, as indicated in dotted lines. It is then moved to the right, then lowered to its lowermost position and then moved inwardly; after which the cycle is repeated.

Adjustably mounted on the rod 24 is a sleeve 27 provided with a downwardly extending stop or finger 28. This stop serves as an abutment for a sleeve 29 pivoted to sleeve 27 as indicated at 30. Mounted in sleeve 29 as by means of set screws 31 is a depending rod 32, on the lower end of which is secured a pusher bar 33, preferably provided with a facing strip 34 of asbestos or the like. The bar 33—34 is adapted to engage a line of ware brought across the front of the leer by the table 4, and push the same onto the leer conveyer 2.

If the pusher bar 33—34 were raised while in contact with the ware there would be a liability of upsetting the ware and in order to eliminate this possibility an elongated stop plate 36 is provided. This stop 36 cooperates with a bar 36' carried by the depending rod 32. As the pusher bar 33—34 approaches its inward limit the bar 36' will engage the stop 36, and further inward movement will rock the rod 32 about its pivot 30 and thus cause the bar 33—34 to move rearwardly away from the line of ware. The rod and pusher bar will remain in this tilted position until such time as the bar 36' rides off of the vertical portion of the stop plate 36 after which the spring 35 will return the parts to normal position.

For the purpose of preventing the ware being upset as it is being pushed into the leer a bar 37 is provided to engage the opposite side of the ware. This bar is fixed to the lower end of a depending rod 38 which is adjustably mounted, as by set screw 39, in a sleeve 40, thereby adapting the steadying bar to ware of different heights.

The sleeve 40 is fixed to a U-shaped bracket 41 which has its legs telescopically mounted in sleeves 43 of a horizontally disposed carriage 44; the bracket being maintained in adjusted position by set screws 42. This adjustment permits the adaptation of the steadying bar to ware of different diameters. This carriage is provided with inwardly extending stub shafts 45 mounted in bearings 46 on a sleeve 47; the latter being adjustably mounted on rod 32 by means of a set screw 48. It will be apparent, therefore, that the carriage 44 may rock on its horizontal pivot and hence carry the ware-steadying bar 37 toward and from the pusher bar 33; but in order to limit the movement toward the pusher bar a stop 49 is provided on sleeve 47, which stop limits the downward pivotal movement of the carriage.

It is essential that the bar 37 be swung clear of the ware when the pusher bar 33 is being brought into engagement with the ware, and for this purpose means is provided for rocking the carriage 44 upwardly about its pivot. This means includes a sleeve 50 adjustably secured to rod 32 by a set screw 51, and supporting a bar 52 provided with bearings for a crank 53. This crank has one arm pivotally connected to a link 54 which is connected to the carriage 44. The other arm of the crank is provided with a roller 55. For cooperation with the roller 55 a horizontal track 56 provided with a downwardly tapered inner end 57 is supported in front of the leer by a bracket 58. As the pusher bar is lowered in its outermost position the roller 55 will engage track 56 and will swing the crank 53 upwardly thereby rocking the carriage and swinging the ware-steadying bar 37 away from the pusher bar. As the pusher bar approaches the leer and engages the ware on the table 4, the roller 55 will descend the inclined portion 57 of the track 56, thus allowing the bar 37 to swing into engagement with the ware.

In order to prevent vibration of the reciprocating rod 24 and provide for a more steady movement thereof as it is carried back and forth along its path by the chains 10 and 11, upper and lower tracks are provided (Figs. 1 and 5) for rollers 60—61 and 60'—61' which are mounted on the bearing members 25. These tracks are indicated by the numerals 62 and 63, and are mounted on the uprights 64 and plate 9. Guide rails 65 and 66 cooperate with the rollers to maintain rod 24 in horizontal position and reduce vibration.

The mechanism for varying the timing between the operation of the pusher bar and the operation of the forming machine, so that the pusher bar will operate when the line of ware is directly in front of the leer, will now be described.

The cam shaft of a conventional forming machine is indicated by the numeral 70 (Fig. 1) and is provided with a gear 71 meshing with a gear 72 on a vertical shaft 73. This shaft has fixedly secured thereto a cam 74 for cooperation with cam rollers 75 on a lever 76. A plate 77 provides a support for the lever 76 on which it is pivoted as by means of a bracket 78, and the plate is in turn supported on a base plate 79. Plate 77 is circumferentially adjustable on base plate 79 and may be secured in adjusted position by means of a clamp 80.

Also mounted on plate 77 is an air valve 81 of the piston and cylinder type, and provided with a piston rod 82 connected to the lever 76. Air under pressure is led to valve 81 by conduit 83, and conduits 84 and 85 lead from the valve to opposite ends of an air cylinder 86. This cylinder, which is shown more clearly in Figure 5, has the end of its piston rod 87 connected by a pin and slot connection 88 with an arm 89 formed on a casing 90. Pivotally mounted on the interior of casing 90 is a spring-pressed pawl 91 for cooperation with a ratchet wheel 92 keyed to a shaft 93. Shaft 93 is mounted in bearings 94 supported in brackets 95 secured to the base of the apparatus; and has mounted thereon a plurality of sprocket wheels 96 (eight being illustrated in the drawings). Sprocket chains 97 mesh with wheels 96 and also with similar wheels 98 mounted on a shaft 99 having its bearings in the brackets 95.

A step-by-step movement is imparted to shaft 93 by means of the pawl and ratchet mechanism 91—92, which is operated by the air cylinder 86; and the operation of this cylinder by the cam shaft of the forming machine. In order to releasably hold the shaft 93 against backward movement, a disc 100 provided with a series of apertures 101 is fixedly secured to the ratchet wheel 92. These apertures correspond in number and position with the teeth on the ratchet wheel. A ball stop 102 is adapted to successively enter each aperture; a spring 103 in a sleeve 104 exerting the necessary pressure on ball 102. This pressure may be adjusted by screw 105. Sleeve 104 and its related parts are supported in cooperative relation with disc 100 by a bracket 106 fixed to the outer wall of cylinder 86 (Fig. 5).

From an inspection of Figure 11 it will be noted that the particular sprocket chain shown is provided with eight rollers 107 equally spaced throughout the length of the chain. The other chains of the set are provided with varying numbers of rollers, which are also equally spaced, but

the spacing being different for each chain. The rollers 107 of any selected chain are adapted to cooperate with a finger 108 mounted on a squared shaft 109 oscillatably mounted in bearings 110 on brackets 95. Finger 108 may be secured to shaft 109 by means of a set screw 111 and hence may be adjusted longitudinally of the shaft so as to cooperate with any one of the eight sets of rollers on the sprocket chains 97.

Shaft 109 is provided with a crank arm 109' to which is pivotally connected one end of a link 112 which has its opposite end pivotally connected to a dog 113. This dog is pivoted on a bracket 114 as indicated by numeral 115, and is adapted to cooperate with an arm 116 of a clutch mechanism 117. Spring 112' returns the dog 113 to operative position. A portion of the clutch 117, namely the casing member 118, is keyed to a hollow shaft 119 which receives an end of a shaft 120 of the reduction gearing 22. Shaft 120 is keyed to stub shaft 119 as indicated by numeral 121, and it will be apparent, therefore, that the clutch member 118 is caused to rotate continuously. This member is provided with an internal annular series of teeth 122 which are adapted to cooperate with teeth on an element 126 of the other clutch member 123. This other clutch element is in the form of a sleeve loosely mounted on shaft 119 and carries the main sprocket drive 20 heretofore referred to. Oscillatably mounted in a bore of the member 123 is a shaft 124 on which is formed the radially extending arm 116 which cooperates with the dog 113. The arm 116 is situated in an outwardly flared slot 125 formed in the face of the member 123 and hence is capable of a slight oscillatory movement. Shaft 124 is provided with an extension 126 on which are formed one or more teeth 127 adapted to cooperate with the internal teeth 122 of the clutch member 118.

A spring 128 normally swings arm 116 to the right (Fig. 9), in which position teeth 127 engage teeth 122 and hence cause the clutch member 123 and sprocket wheel 20 to take up the movement of the shaft 120. Just as soon, however, as the arm 116 is brought into engagement with the dog 113 the arm is swung in the opposite direction to disengage the teeth 127 from the internal gear 122. In this position of the parts the sprocket wheel 20 is freed from the drive shaft 120 and the pusher bar mechanism will remain idle until such time as the dog 113 is operated to release the arm 116. As soon as the arm 116 is released the spring 128 will throw it over to a position in which the teeth 127 and 122 are again engaged and the sprocket wheel 20 will be again actuated to operate the pusher bar.

The standards 64 and plate 9 which form the main supports for the operating mechanism are reinforced by a plate 129 bolted to the upper ends thereof, and the plate serves the further purpose of housing a major portion of the operating mechanism.

Having fully described the construction of the apparatus, the operation of the mechanism as a whole will now be described.

The frequency of operation of the pusher bar is dependent upon the speed of operation of the forming machine and the diameter of the articles being formed. Therefore, the position of the finger 108 will be dependent upon those factors, i. e., the finger will be adjusted to a position for cooperation with the chain 97 most suitable for the speed of the forming machine and the diameter of the article being manufactured.

The mechanism is set in operation, and upon each rotation of the camshaft 70 the valve 81 is operated to admit air to the cylinder 86 and cause one complete cycle of operation of the pawl 91, thereby moving the shaft 93 one step of its rotation or 36°. This step-by-step rotation of shaft 93 will cause the rollers 107 to be successively brought into engagement with finger 108 and rock the shaft 109. Each rocking movement imparted to the shaft 109 will cause an oscillation of the dog 113 which will release the clutch arm 116. As the arm 116 is released the spring 128 will cause the teeth 127 and 122 of the two clutch members to engage and the sprocket wheel 20 will therefore make a complete revolution. This movement of the wheel 20 will be transmitted through the gearing heretofore described and will cause one complete cycle of rod 24 and pusher bar 33—34.

As the pusher bar is lowered from its dotted line position shown in Figure 1 the roller 55 engages the track 56 and swings the ware-steadying bar 37 away from the pusher bar 33. As the bar 33 is drawn inwardly it will engage the line of ware on the table directly in front of the leer preparatory to pushing it onto the leer conveyer 2. At this time the roller 55 will ride down the inclined part of the track 56 and thus permit the ware-steadying bar 37 to engage the opposite side of the ware to prevent it from tipping over or wobbling as it is pushed into the leer. Further inward movement of the pusher bar will cause the bar 36' to engage the stop 36 thereby causing the pusher bar to move rearwardly away from the line of ware and avoiding the liability of upsetting the ware as the pusher bar is raised. The rod 24 having reached the limit of its inward movement it is raised bodily by the chains 10 and 11, and then carried forwardly to repeat the cycle, when the clutch is rendered operative.

As mentioned above, the finger 108 is adjusted to the proper timing chain 97 as determined by the size of the ware and the speed of operation of the forming machine. Obviously, however, the number of articles formed in the time intervals between operations of the pusher bar may not line up directly in front of the leer at the moment of initiation of the inward movement of the pusher bar. If the articles are not in proper alignment with the leer when the pusher bar begins its inward stroke it is only necessary to change slightly the time of operation of the pusher bar with respect to the time of operation of the forming machine. This adjustment may be readily made by loosening clamp 87 (Fig. 1) and sliding the plate 77 in the proper direction so as to alter the time of operation of the valve 81. The plate 77 is then clamped in its adjusted position and the apparatus will continue to operate in proper timed relation to the forming machine.

In accordance with the patent statutes we have described herein the preferred embodiment of the invention, but it is to be understood that many changes may be made in the construction without departing from the spirit of the invention, and all such changes are intended to be included within the scope of the appended claims.

What we claim is:

1. The combination with a forming machine, of a leer loader including a pusher bar, means for reciprocating the pusher bar, and variable means operatively connected with the forming machine for controlling the operation of said bar in ac-

cordance with the number of articles formed on the machine.

2. The combination with a forming machine, of a leer loader including a pusher bar, means including a clutch for reciprocating the pusher bar, and variable means operatively connected with the forming machine for throwing the clutch into operative position upon the formation of a predetermined number of articles.

3. The combination with a forming machine, of a leer loader including means for carrying ware across the front of the leer, means for pushing the ware into the leer, means for timing the operation of the ware-pushing means in accordance with the number of articles formed on the machine, means driven by the forming machine for operating the timing means, said last-named means being adjustable to change the time of operation of the ware-pushing means with respect to the time of operation of the forming machine.

4. The combination with a forming machine, of a leer loader including means for carrying ware across the front of the leer, means for pushing the ware into the leer, means including a cam and rocker arm for timing the operation of the ware-pushing means, said rocker arm being bodily movable to vary the time of operation of the ware-pushing means relative to the time of operation of the forming machine.

5. The combination with a forming machine, of a leer loader including means for carrying ware across the front of the leer, means for pushing the ware into the leer, means for timing the operation of the ware-pushing means, said timing means including a cam driven by the forming machine and a rocker arm cooperating therewith, and means for providing an adjustment between the cam and rocker arm to change the time of operation of the ware-pushing means relative to the time of operation of the forming machine.

6. The combination with a forming machine, of a leer loader including means for carrying ware across the front of the leer, means for pushing the ware into the leer, means for timing the operation of the ware-pushing means, said timing means including a cam driven by the forming machine and a rocker arm, and an adjustably mounted plate on which the rocker arm is mounted whereby adjustment of the plate will change the time of operation of the ware-pushing means relative to the time of operation of the forming machine.

7. A leer loader including a pusher bar, means for raising and lowering the pusher bar and for moving it toward and from the leer, a ware-steadying bar pivotally associated with the pusher bar, a crank for swinging the ware-steadying bar about its pivot, a track adapted to be engaged by and rotate the crank as the pusher bar is lowered toward operative position, the inner end of the track being curved downwardly, whereby the crank and ware-steadying bar are allowed to return to their normal positions as the pusher bar is moved toward the leer.

8. A leer loader including a horizontally reciprocable rod, a depending rod carried by said reciprocable rod, a pusher bar supported on said depending rod, a carriage pivotally mounted on the depending rod, and a ware-steadying bar suspended from said carriage.

9. A leer loader including a horizontally reciprocable rod, a depending rod adjustably mounted on said rod, a pusher bar fixed to the depending rod, a pivotally mounted carriage adjustably supported on said depending rod, and a ware-steadying bar adjustably mounted on said carriage.

10. A leer loader including a horizontally reciprocable rod, a depending rod pivotally connected to the reciprocable rod, a pusher bar fixed to the depending rod, a spring for biasing the depending rod about its pivot, and means for tilting said rod against the action of the spring.

11. A leer loader including a horizontally reciprocable rod, a depending rod pivotally connected to the reciprocable rod, a pusher bar fixed to the depending rod, a spring for biasing the depending rod toward the leer, a stop for limiting the action of the spring, and means for tilting said depending rod.

12. The combination with a forming machine, of a leer loader, means for timing the operation of the leer loader in accordance with the number of articles formed on the machine, said timing means including a plurality of sprocket chains, a plurality of differently spaced lugs on said chains, and a lever adjustably mounted for cooperation with any one of said chains.

13. The combination with a forming machine, of a leer loader including a pusher bar for pushing the ware into the leer, means for operating the pusher bar, means for controlling the operation of the pusher bar including a plurality of selective timing chains, means driven by the forming machine for controlling the operation of the timing chains, said last-named means being adjustable to vary the time of operation of the chains relative to the time of operation of the forming machine.

14. The combination with a forming machine having a timing shaft, of a leer loader including a pusher bar, means for reciprocating the pusher bar, a variable timing device for the pusher bar, and means operated by the timing shaft of the forming machine for operating the timing device.

ARTHUR W. BEESON.
ISAAC H. STRIDER.