July 22, 1924. 1,502,561

W. E. GLASPEY

MACHINE FOR MAKING BOTTLES, ETC

Filed May 29, 1922 3 Sheets-Sheet 1

Fig. 1.

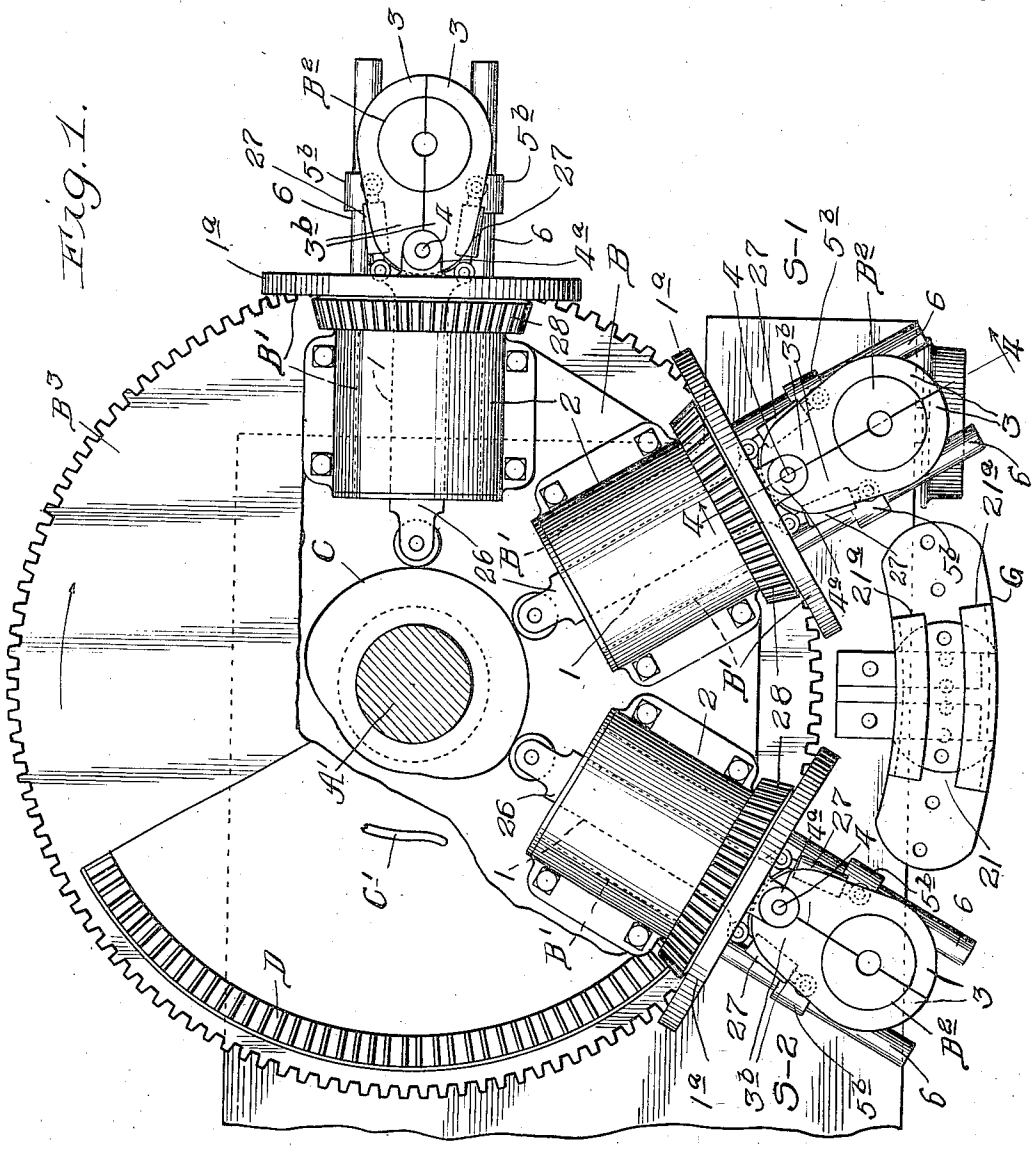
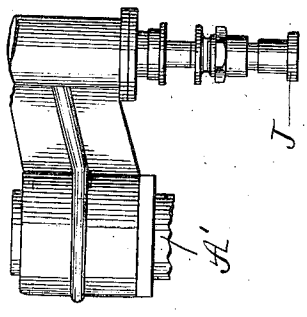


Fig. 1a.



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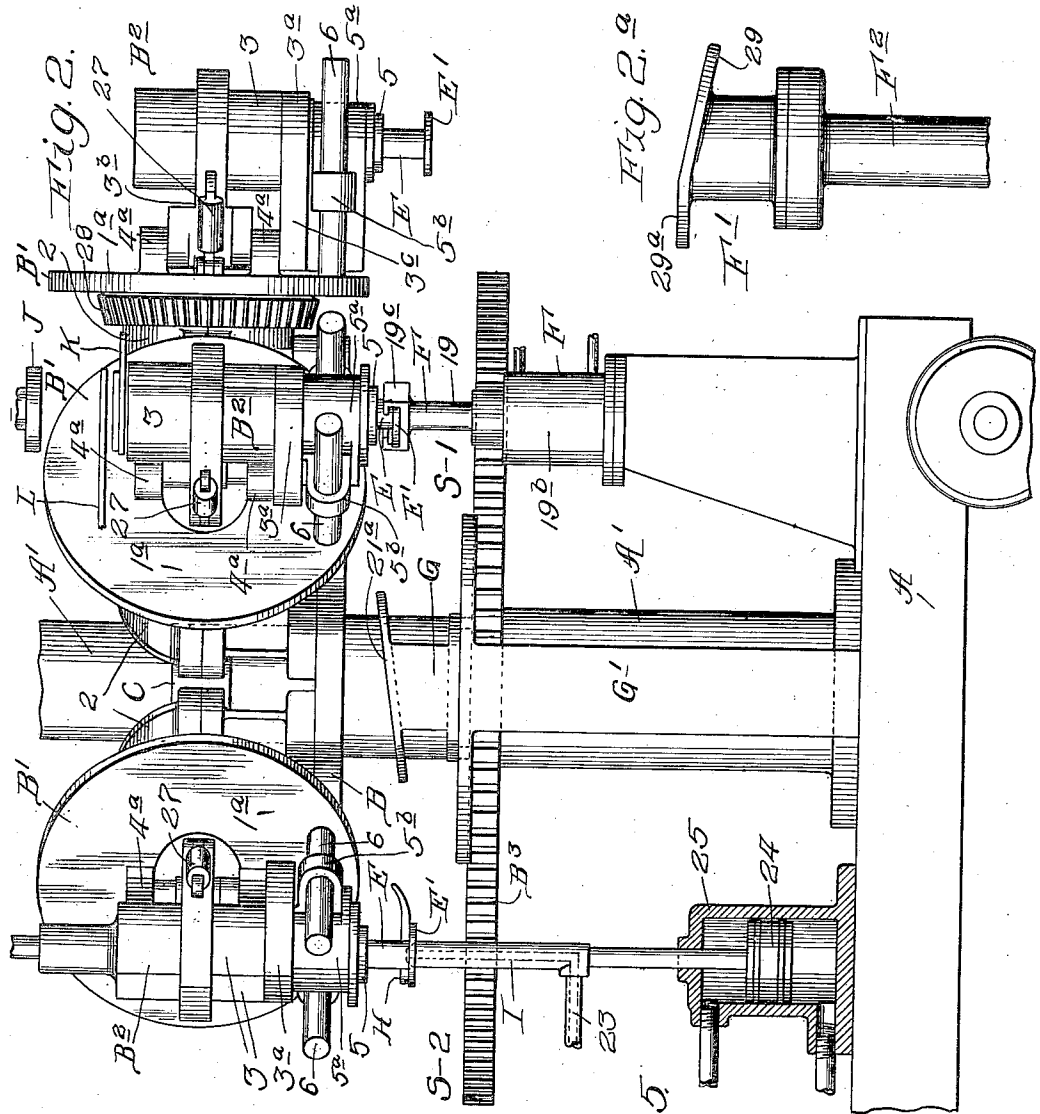


Fig. 2.

Fig. 2a.

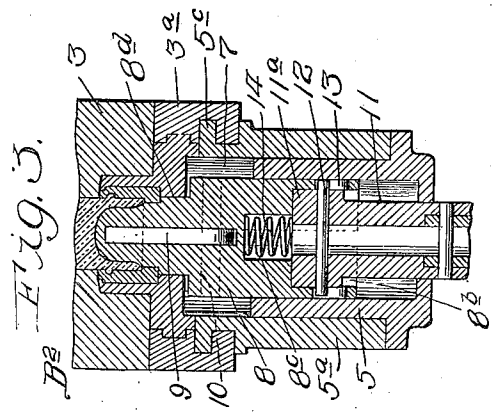


Fig. 3.

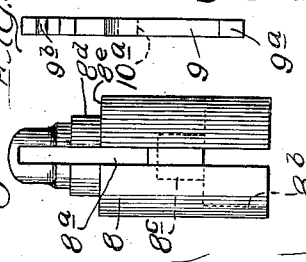


Fig. 4.

Fig. 5.

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Filed May 29, 1922 3 Sheets-Sheet 3

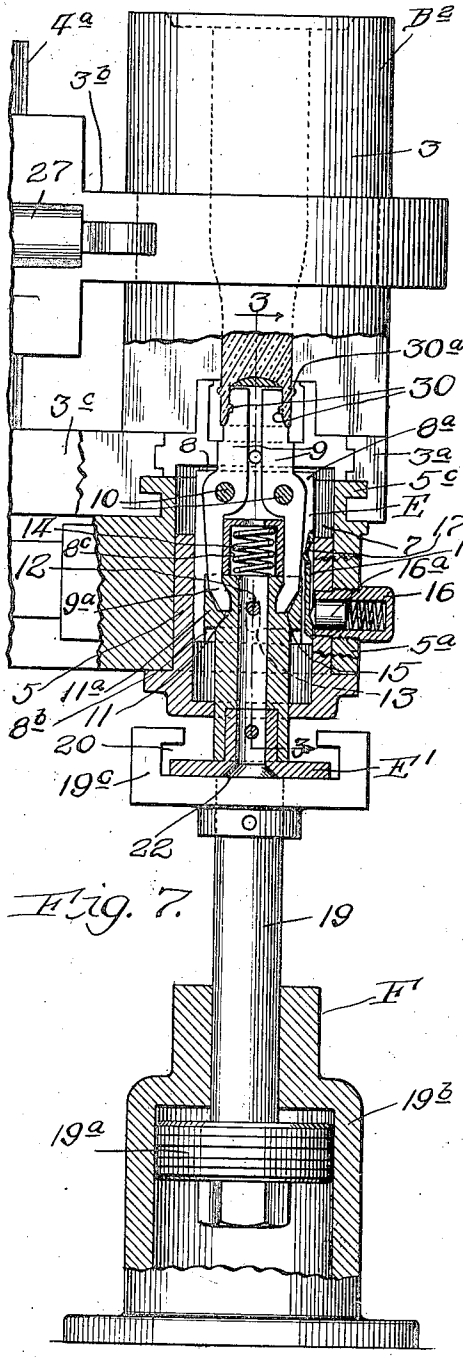


Fig. 7.

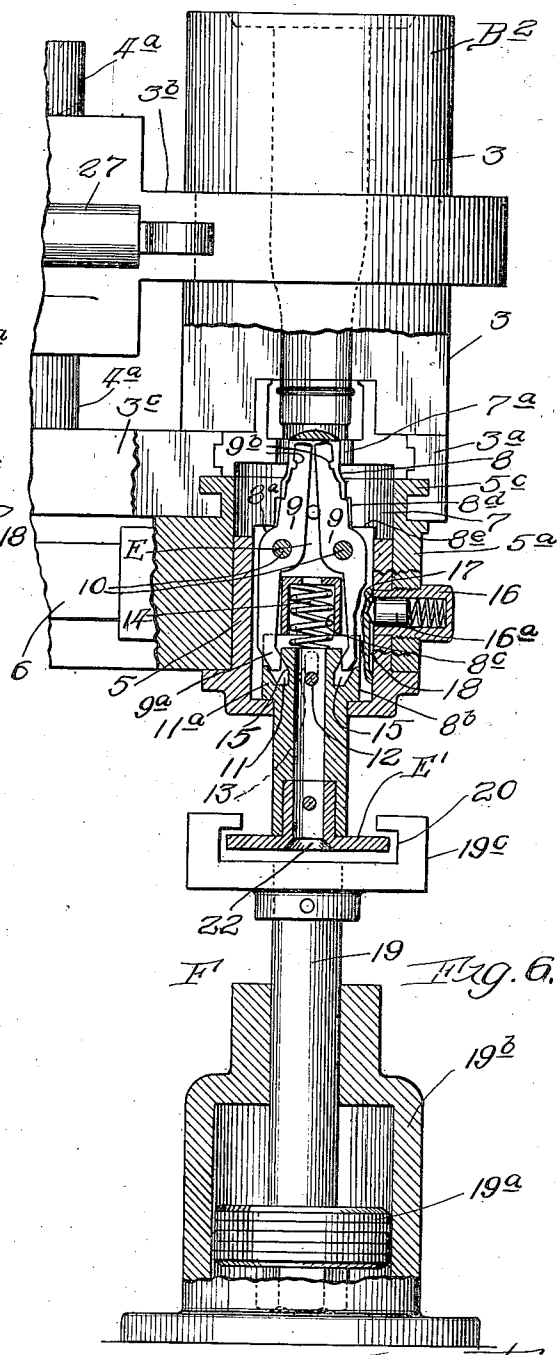


Fig. 6.

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Patented July 22, 1924. 1,502,561

UNITED STATES PATENT OFFICE.

WARREN E. GLASPEY, OF BRIDGETON, NEW JERSEY, ASSIGNOR TO SPRING STOPPER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

MACHINE FOR MAKING BOTTLES, ETC.

Application filed May 29, 1922. Serial No. 564,597.

To all whom it may concern:

Be it known that I, WARREN E. GLASPEY, a citizen of the United States, residing at Bridgeton, in the county of Cumberland and State of New Jersey, have invented a new and useful Machine for Making Bottles, Etc., of which the following is a specification.

This invention relates particularly to machines for making bottles, or similar containers, which are adapted to receive threaded stoppers, or stoppers equipped with thread segments; and the primary object of the invention is to provide an improved machine for the purpose indicated, which is capable of large output, which reduces wastage to a minimum, and which is economical in operation.

The improved machine, in its preferred embodiment, is adapted to provide the bottle or container, within the mouth portion, with lugs, or thread-segments, which are adapted to be engaged by threads or thread-segments with which the stopper is provided. The stoppers may be made of glass or other suitable material.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents a broken plan sectional view of a bottle-making machine embodying the invention; Fig. 1ª, a broken elevational view showing the upper part of the main standard of the machine, and a blow-head mounted thereon; Fig. 2, a broken elevational view of the improved machine; Fig. 2ª, a broken elevational view showing a modification of the device for elevating the mandrels, in succession; Fig. 3, a broken vertical sectional view taken as indicated at line 3 of Fig. 7; Fig. 4, an elevational view of a mandrel-tip employed; Fig. 5, an enlarged edge elevational view of one of the sheathable levers with which the mandrel-tip is equipped; Fig. 6, a broken elevational view, partly in section, showing a mold, the associated mandrel, and the means for elevating the mandrels; and Fig. 7, a view similar to Fig. 6 but showing the mandrel in the elevated position.

It may be stated preliminarily that a bottle-making machine of the general type illustrated is known, such machine involving the use of a rotary mold-carrier having invertible molds mounted on the carrier. The present invention relates particularly to the provision of means in connection with such a machine whereby bottles may be produced which have the interiors of their mouth portions equipped with lugs or thread-segments. It may be added that in the construction herein illustrated the rotary mold-carrier is equipped with revoluble mold-supports which serve to invert the molds and then right them as the molds are carried in their orbit; a mandrel is associated with each mold, the mandrel being provided with sheathable levers which have the edges of their upper end portions equipped with recesses which provide the matrices in which the lugs or thread-segments are formed; a local mandrel-elevating device is provided at or near the glass-charging station, this device serving to elevate the mandrels, in turn, before the glass-charging operation is performed; and a local mandrel-lowering device is provided for lowering the mandrels, seriatim, as the molds pass in turn, from the glass-charging station to the bubble-blowing station. At the intermediate station shown in Fig. 1, the glass-charging operation is performed after the mandrel has been elevated; and at the next station the bubble-blowing operation is performed after the mandrel has been lowered. At the intermediate station mentioned, a blow-head is employed to force the glass down into the lower portion of the mold so that it will form properly about the tip of the mandrel in the neck portion of the mold. Bottle blanks, or parisons, are formed in the machine illustrated in the accompanying drawings; the molds are, in the operation of the machine, inverted and opened and the parisons or bottle blanks are transferred to a blowing machine; and the final operation of blowing the bottle is performed in the machine last referred to, no illustration of such machine being required for the purpose of the description of the present invention.

In the embodiment of the invention illustrated, A represents the base of the frame, from which rises a stationary shaft or column A′; B, a rotary mold-carrier having revolubly mounted thereon a series of mold-supports B′ upon which are mounted molds B²; B³, a large gear through the medium of

which the mold-carrier B is rotated, so that the molds will be carried in an annular path or orbit; C and C′, stationary cams which serve to open and close the molds; D, a stationary bevel-gear segment which serves to rotate the mold-supports and invert and then right the molds as they are carried through their orbit; E, a tubular mandrel associated with each mold, each mandrel being equipped at its lower projecting end with a head or cam-member E′; F, a mandrel-elevating device located at the glass-charging station; G, a mandrel-lowering device located between the glass-charging station and the bubble-blowing station; H, a stationary cam serving to hold the mandrel in the lowered position during the bubble-blowing operation; I, a bubble-blowing device located beneath the path of the molds; and J, a blow-head carried by the upper portion of the stationary column A′ and disposed above the path of the molds, the blow-head J being located at the glass-charging station.

The frame, which comprises the base A and column A′, may be of any suitable construction. The fixed center column A′ serves as an axis about which the mold-table B, actuated by the gear B^3, turns; and the column A′ serves also to support certain mechanisms, including the blow-head which is employed for blowing the glass down into the mold so that it will form properly about the tip of the mandrel in the neck portion of the mold. The blow-head J employed for this purpose is of the usual construction, and operates in the usual manner.

The mold-table is given an intermittent or step-by-step movement in any desired manner. The mold-carrying means comprises the table B and the series of mold-supports B′ arranged thereon. Each mold-support comprises a hollow trunnion or gudgeon 1 and a disk or face-plate 1^a formed integrally therewith. The hollow trunnion 1 is journaled in a divided bearing-box 2 which is securely fastened to the table B.

Each mold B^2 comprises a pair of main mold sections 3 and a pair of ring-mold sections 3^a. These sections meet in a vertical plane and are provided with arms 3^b and 3^c, respectively, which are connected at their inner ends with a pivot 4 carried by lugs 4^a which project from the face-plate 1^a. Thus, the mold sections are capable of separating at a plane containing the axis of the mold.

The mandrel or plunger E associated with each mold works through a sleeve 5 which is secured in a tubular head 5^a carried by studs 6 which project from the face-plate 1^a. The shank of the bracket which comprises the ring 5^a is equipped with perforated lugs 5^b which are mounted on the studs 6. The tubular portion 5^a of the bracket is thus staunchly supported on the studs 6 and may be adjusted thereon, if desired. Any suitable securing means (not shown) may be employed. The tubular portion 5^a of the bracket is located directly below the mold and is provided at its upper portion with a peripheral flange 5^c which interlocks with flanges with which the ring sections 3^a of the mold are provided. The sleeve 5 is secured in the ring or tubular member 5^a in any desired manner.

Above the sleeve 5 is a chamber 7 which communicates through a passage 7^a with a mold cavity. The mandrel-tip is adapted to project snugly through the passage 7^a. The mandrel-tip is designated 8. It is provided with slots 8^a in which are mounted a pair of levers 9. The levers 9 are mounted on the pivots 10 which pass through perforations 10^a in the levers, the end portions of the pivots being supported in the walls of the mandrel-tip 8. The mandrel-tip is provided at its lower portion with an enlarged bore 8^b and above this bore with a smaller bore 8^c. The mandrel is provided with a tubular shank 11 with the lower end of which the disk or cam E′ is securely connected. The shank 11 has an enlarged upper end 11^a which is adapted to work in the enlarged bore 8^b with which the mandrel-tip is provided. Extending horizontally through the head or enlarged portion 11^a is a stud 12 whose extremities project and work in vertical slots 13 with which the walls surrounding the bore 8^b of the mandrel-tip are provided. The smaller bore 8^c of the mandrel-tip serves as a chamber for a coil spring 14 which is confined between the mandrel-tip and the head 11^a of the tubular shank 11. Thus, there is lost-motion connection between the tubular shank 11 and the mandrel-tip; and the spring 14 tends to hold the mandrel-tip in the elevated position with respect to the mandrel shank shown in Fig. 6.

The lower ends of the lug-forming levers 9 are provided with cams 9^a which coact with cam recesses 15 with which the head 11^a of the tubular shank 11 is provided. When the mandrel-tip 8 is projected with relation to the mandrel-shank, the cams cause the upper ends of the levers to be sheathed within the slots of the mandrel-tip, as shown in Fig. 6. The outer edges of the upper portions of the levers 9 are provided with recesses 9^b which are adapted to form internal lugs or thread-segments on the inner surface of the bottle mouth, as shown in Fig. 7. The upper portion of mandrel-tip is suitably shaped to give the desired shape to the mouth of the bottle; and the outer edges of the upper portions of the levers 9 are shaped to correspond with the shape of the mandrel-tip when the levers are in the operative position. The mandrel-tip 8 has a reduced portion 8^d which is adapted to fit in the opening 7^a leading to the mold cavity, when the mandrel-tip is in the

elevated position. The levers are correspondingly shaped to complete the contour when the levers are in the operative position. The mandrel-tip is further provided with a horizontal shoulder 8^e which is adapted to strike against the bottom of the mold and limit the upward movement of the mandrel-tip when the mandrel is elevated.

Through the tubular part 5^a and the sleeve 5 extends a plunger guide 16 in which works a spring-pressed pointed plunger 16^a which is adapted to engage a lateral recess 17 with which the mandrel-tip 8 is provided. The pointed tip of the plunger 16^a is adapted to work in a vertical slot 18 when the mandrel-tip is forcibly moved.

The glass-charging station is designated S^1 and the bubble-blowing station is designated S^2. The mandrel-elevating device F is located beneath the path of the molds at the glass-charging station. The device F preferably comprises a plunger 19 operated by a piston 19^a located in the cylinder 19^b. The plunger 19 is equipped with a head 19^c which has a channel or T-slot 20 extending horizontally therethrough. As each mold is carried to the glass-charging station, the cam-disk E′ of the associated mandrel enters the channel 20 as shown in Fig. 6. When the machine comes to rest, the plunger 19 is elevated to elevate the mandrel to the position shown in Fig. 7. After the glass-charging operation the charged mold is carried to the bubble-blowing station, the cam-disk E′ sliding out of the channel 20 as the mold is carried away from the charging station.

As the mold approaches the bubble-blowing station, the cam-disk E′ engages the mandrel-lowering device G. The device G is mounted on a standard G′ carried by the frame-base A. The device G is provided with an inclined T-slot 21 which affords overhanging inclined flanges 21^a. The cam-disk E′ of the mandrel-shank passes beneath the inclined flanges 21^a, and the mandrel is thereby withdrawn. In the first portion of the downward movement of the mandrel-shank, the shank moves with relation to the mandrel-tip, thereby actuating the levers and sheathing the upper portions of the levers. This withdraws the levers from engagement with the lugs or thread-segments formed on the interior of the bottle mouth. In the final portion of the downward movement of the mandrel-shank, the mandrel-tip is withdrawn, so that the passage 7^a which leads to the mold cavity is open to admit air to the mold.

At the bubble-blowing station, the bubble blow-head I is elevated until its tip engages the conical recess 22 at the lower end of the mandrel-shank. Air is admitted to perform the bubble-blowing operation, through a pipe 23. The bubble blow-head I is actuated by the piston 24 confined in a cylinder 25. At the bubble-blowing station, the cam-disk E′ of the mandrel-shank passes beneath the stationary cam H, so that the mandrel will not be caused to rise when the bubble-blowing device is forced against the lower end of the shank.

The rotary table or mold-carrier is intermittently actuated in the usual manner. After the bubble-blowing operation is performed, the mold is carried around, inverted, and righted, the parison being transferred to the bottle-blowing machine in the usual manner.

At the glass-charging station, after the molten "metal" has been introduced into the mold, the blow-head G descends and air is forced into the upper portion of the mold. This causes the glass to be forced into the lower portion of the mold and properly formed about the mandrel-tip. In Fig. 2, K represents a funnel which may be employed in the glass-charging operation if desired; and L represents a shears for cutting off the glass.

The molds are opened and closed by means of plungers 26 operated by the cams C and C′. Each plunger 26 is connected, by links 27, with the mold sections.

On the hollow trunnion 1 of each mold-support is secured a bevel-gear 28 which coacts with the stationary bevel-gear D to invert and right the molds. The rack D is supported in any suitable manner (details not shown). The molds may be maintained in their normal upright position by any suitable expedient (not shown). If desired, frictional contact between the trunnion 1 of the mold-support and the sectional bearing-box may be such as to cause the bearing-box to grip the trunnion of the mold-support sufficiently to maintain the mold in its upright position during the passage of the mold from one station to another. Any suitable or usual locking device may be employed for releasably locking the molds in upright position if desired. Such locking device is not illustrated, however.

The operation may be briefly stated as follows:

The mold-table B is given an intermittent movement of rotation in the usual manner, the rotation being effected through the medium of the large gear B^3. When a mold reaches the glass-charging station, the device F operates to elevate the mandrel from the position shown in Fig. 6 to the position shown in Fig. 7. The glass-charging operation is then performed, and the blow-head J descends upon the mold and air is admitted to the upper portion of the mold to force the glass into the lower portion of the mold so that it will form properly about the mandrel in the neck portion of the mold.

As the mold leaves the glass-charging station, the cam-disk E′ of the mandrel moves out of the channel or T-slot 20 of the mandrel-elevating device. During the passage of the mold to the bubble-blowing station, the cam-disk E′ rides beneath the inclined flanges 21ª of the device G thereby lowering the mandrel. At the bubble-blowing station, the stationary cam H serves to hold the mandrel against elevation during the bubble-blowing operation.

The improved machine operates in the same automatic manner as do machines of this type employed for making bottles having plain, or unthreaded interior mouth surfaces; and the improved machine is capable of the usual large output of an automatic machine of this type. Thus, bottles of merchantable character can be produced economically and in large quantities, such bottles being provided in their mouth portions with internal threads.

Fig. 2ª illustrates a modified form of mandrel-elevating device. This device is designated F′. It comprises a cam-member having an inclined portion 29 and a horizontal portion 29ª. The device F′ is mounted on a standard F² carried by the base A of the main frame. The device F′ is so located with relation to the glass-charging station that the cam-disks E′ of the mandrels will ride over the inclined portion 29 and onto the horizontal portion 29ª, thereby elevating each mandrel, in turn, and holding the mandrel elevated, during the glass-charging operation. After the glass-charging operation, the cam-disk E′ of the mandrel rides off the horizontal portion 29ª of the cam F′ as the mold is carried towards the bubble-blowing station.

If desired, the cam H may be dispensed with and some other suitable provision made for holding the mandrel in lowered position during the bubble-blowing operation. This may be effected by means of a suitable number of spring-pressed catches, such as the catch 16ª; or other suitable means may be employed. The catch 16ª is adapted to releasably hold the mandrel-tip in either the elevated or the depressed position. The catch serves, furthermore, to prevent idle movement or shifting of the mandrels in their bearings during the inverting and righting of the molds.

In Fig. 7, 30 designates the lugs which are formed in the interior of the container mouth 30ª. As has been stated, these lugs may be of any suitable form adapted to engage the threads or thread-segments of a stopper. It is preferred to employ at least two of the lug-forming sheathable levers 9.

While the invention is illustrated in connection with an automatic machine of the type in which invertible molds are employed, it may be used in connection with any automatic or semi-automatic machine of the type in which molds are carried in an annular path, each mold having associated therewith a mandrel provided with sheathable or collapsible means for forming the lugs on the interior of the container-mouth, the mandrels being raised and lowered automatically in the operation of the machine.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, it being the intent to claim the invention as fully as possible in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is:

1. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a non-rotating mandrel associated with each mold and equipped with a sheathable lug-forming member, and means for raising and lowering the mandrels.

2. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a non-rotating mandrel associated with each mold and provided with a sheathable lug-forming member and equipped with means for projecting and sheathing said member, and means for raising and lowering the mandrels.

3. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a mandrel associated with each mold, said mandrel having a tip-portion equipped with a sheathable lug-forming member and having a shank-portion movable with relation to said tip-portion and adapted to project and retract the lug-forming member, local means adapted to engage the shanks of said mandrels and elevate the mandrels, and local means adapted to engage the shanks of said mandrels and lower the mandrels.

4. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a mandrel-bearing beneath each mold, a mandrel working through each mandrel-bearing, each mandrel having a tip-portion and having a shank-portion, with lost-motion connection between the tip-portion and the shank-portion, a pair of levers mounted in slots in the tip-portion and having their upper portions provided with lug-forming recesses and having their lower portions equipped with cams, the shank-portion being equipped with co-operating cams, local means for engaging the shank-portions of the mandrels and elevating the mandrels, and local means for engaging the shank-portions of the mandrels and lowering the mandrels.

5. In a machine of the character set forth, the combination of a mold-carrier, a series

of molds carried thereby, a non-rotating mandrel associated with each mold, each mandrel being equipped with a sheathable lug-forming member and having associated means for projecting and sheathing said lug-forming member, a projection carried by the lower portion of the mandrel, local means for elevating the mandrel, and a local cam-device adapted to engage the projection at the lower end of each mandrel, in turn, and thereby lower the mandrels.

6. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carrier thereby, a non-rotating mandrel associated with each mold and provided with a sheathable lug-forming member and associated means for projecting and sheathing said member, means for elevating the mandrels before they reach the glass-charging station, means for lowering the mandrels before they reach the bubble-blowing station, and means for holding the mandrels in lowered position during the bubble-blowing operation.

7. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a mandrel associated with each mold, each mandrel having a tip-portion provided with slots and having a shank-portion, lost-motion connections between the tip-portion and the shank-portion of each mandrel, a spring interposed between the tip-portion and shank-portion of each mandrel, lug-forming levers mounted in the tip-portion of each mandrel, cam connection between the lower end of said levers and the shank of the mandrel, means yieldingly tending to hold the tip-portion of the mandrel against movement, and local means for elevating the mandrels prior to the glass-charging operation and lowering them prior to the bubble-blowing operation.

8. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a mandrel associated with each mold, each mandrel having a tip-portion provided with slots and having a shank-portion, lost-motion connections between the tip-portion and the shank-portion of each mandrel, a spring interposed between the tip-portion and shank-portion of each mandrel, lug-forming levers mounted in the tip-portion of each mandrel, cam connection between the lower end of said levers and the shank of the mandrel, means yieldingly tending to hold the tip-portion of the mandrel against movement, local means for elevating the mandrels, in turn, prior to the glass-charging operation, and local means for lowering the mandrels prior to the bubble-blowing operation.

9. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a non-rotating mandrel associated with each mold and provided with a sheathable lug-forming member and associated means for projecting and sheathing said member, and a pneumatic device at the glass-charging station provided with means for engaging the shank of each mandrel and effecting elevation of the mandrel.

10. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a non-rotating mandrel associated with each mold and provided with a sheathable lug-forming member and associated means for projecting and sheathing said member, and a cam-device adapted to engage the shank of each mandrel and effect the lowering of the mandrel as the mold is carried from the glass-charging station to the bubble-blowing station.

11. In a machine of the character set forth, the combination of a mold-carrier, a series of molds carried thereby, a mandrel-bearing associated with each mold, a mandrel working through each of said bearings, the mandrel having a tip-portion provided with slots and having a shank-portion connected with the tip-portion by lost-motion connections, a spring interposed between the tip-portion and the shank-portion of the mandrel, a spring-pressed plunger engaging the tip-portion of the mandrel, sheathable levers mounted in the tip-portion of the mandrel and provided at their lower ends with cams, coacting cams carried by the shank of the mandrel, local means for engaging the shanks of the mandrels and effecting elevation of the mandrels, and local means for engaging the shanks of the mandrels and effecting lowering of the mandrels.

12. In a machine of the character set forth, the combination of a rotary mold-carrier, a series of molds mounted thereon, a blow-head located above the path of the molds at the glass-charging station, a non-rotating mandrel associated with each mold and provided with sheathable lug-forming members and associated means for projecting and sheathing said members, means for elevating the mandrels preparatory to the glass-charging operation, a bubble blow-head located beneath the path of the molds at the bubble-blowing station, and means for lowering the mandrels, in turn, after the glass-charging operation.

13. In a machine of the character set forth, the combination of a rotary mold-carrier, a series of molds mounted thereon, a blow-head located above the path of the molds at the glass-charging station, a non-rotating mandrel associated with each mold and provided with sheathable lug-forming members and associated means for project-

ing and sheathing said members, means for elevating the mandrels preparatory to the glass-charging operation, a bubble blow-head located beneath the path of the molds at the bubble-blowing station, and means for holding the mandrels in depressed position during the bubble-blowing operation.

14. In a machine of the character set forth, the combination of a rotary mold-carrier and a series of molds mounted thereon, a blow-head located above the path of the molds at the glass-charging station, a mandrel associated with each mold and provided with sheathable lug-forming members and associated means for projecting and sheathing said members, a vertically-actuated plunger located beneath the path of the mandrels at the glass-charging station and adapted to elevate the mandrels, in turn, and a cam-device adapted to engage the shanks of the mandrels and lower the mandrels as the molds are carried from the glass-charging station to the bubble-blowing station.

15. In a machine of the character set forth, the combination of a mold-carrier adapted to carry molds in an orbital path, a series of invertible molds mounted on said carrier, means for inverting and righting the molds, a mandrel-bearing in alignment with each mold, a non-rotating mandrel working through each of said bearings, each mandrel comprising a tip-portion equipped with sheathable lug-forming levers and a shank-portion adapted to actuate said levers, a blow-head located above the path of the molds at one station, a bubble-blowing device located below the path of the molds at another station, local means for elevating the mandrels preparatory to the glass-charging operation, and local means for lowering the mandrels preparatory to the bubble-blowing operation.

WARREN E. GLASPEY.