A. B. STARR.

MACHINE FOR AFFIXING CLOSURES TO VESSELS.

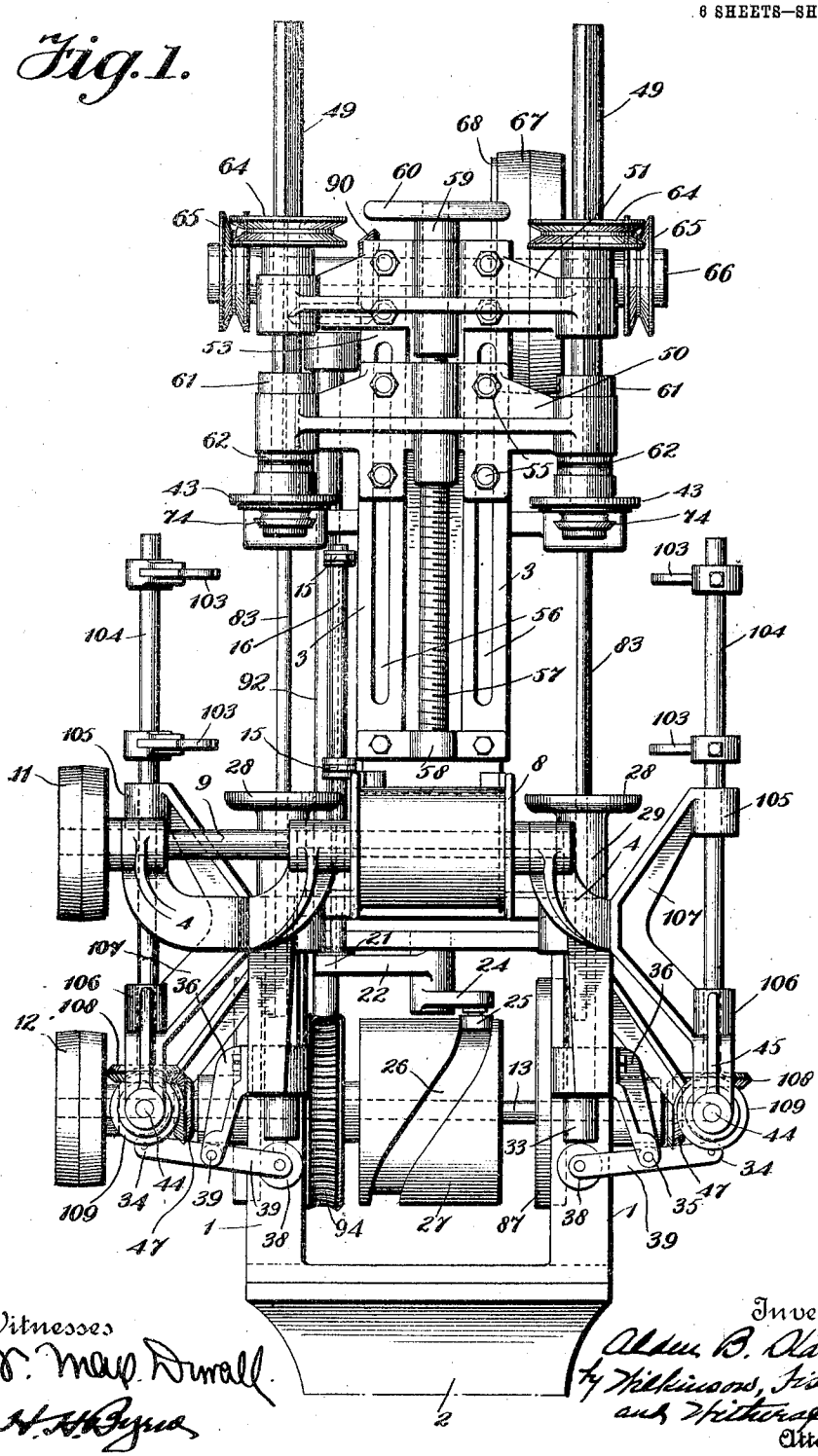
APPLICATION FILED JULY 21, 1911.

1,038,983.

Patented Sept. 17, 1912.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses

W. May Duvall.

H. L. Bryan

Inventor

Allen B. Starr

by Wilkinson, Fisher and Witherspoon

Attorney

A. B. STARR.

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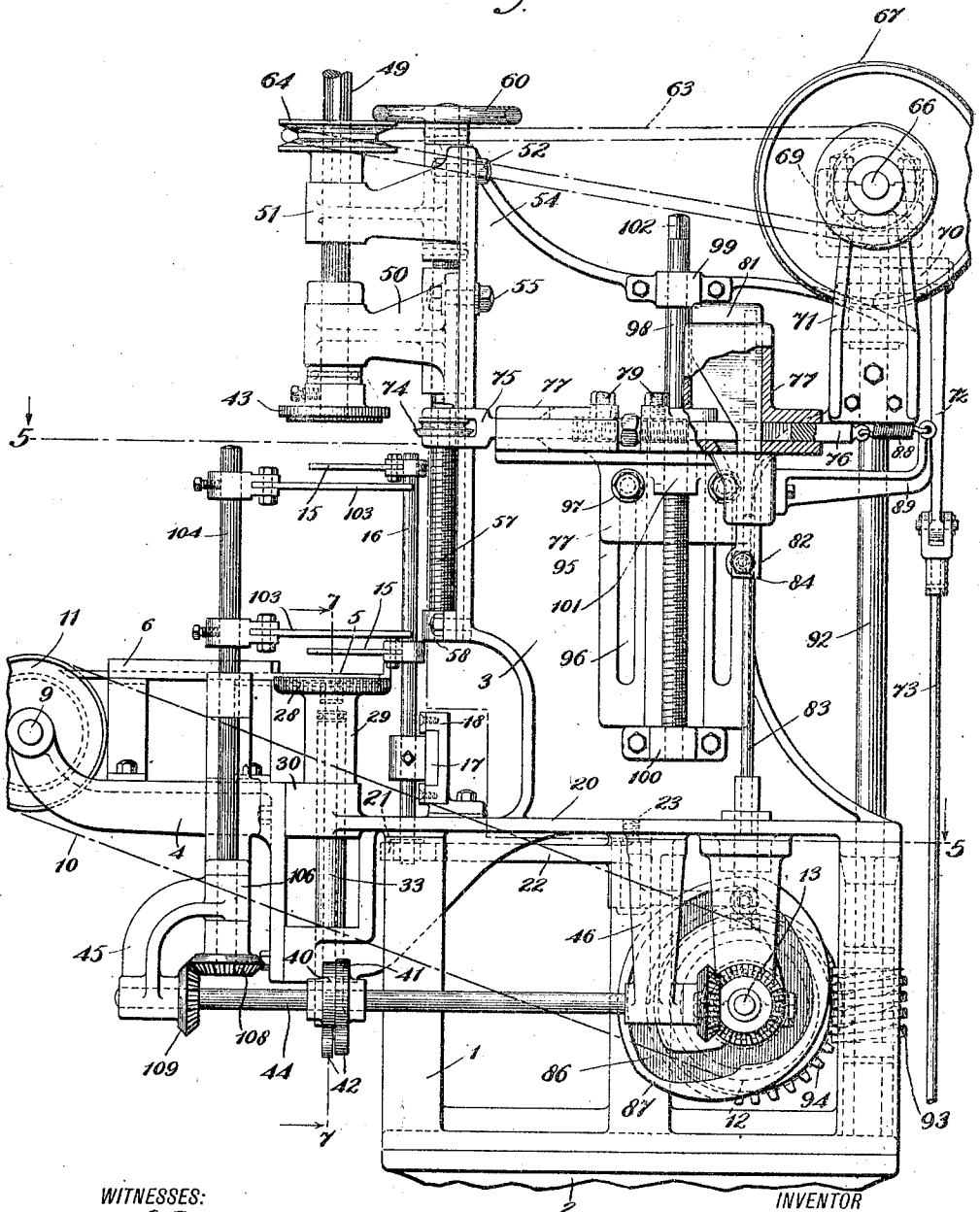
6 SHEETS—SHEET 2.

Fig. 2



WITNESSES:

Chas. F. Clagett

H. H. Bygum

INVENTOR

Alden B. Starr

BY

Wilkinson, Fidler & Whittemore

ATTORNEY

A. B. STARR.

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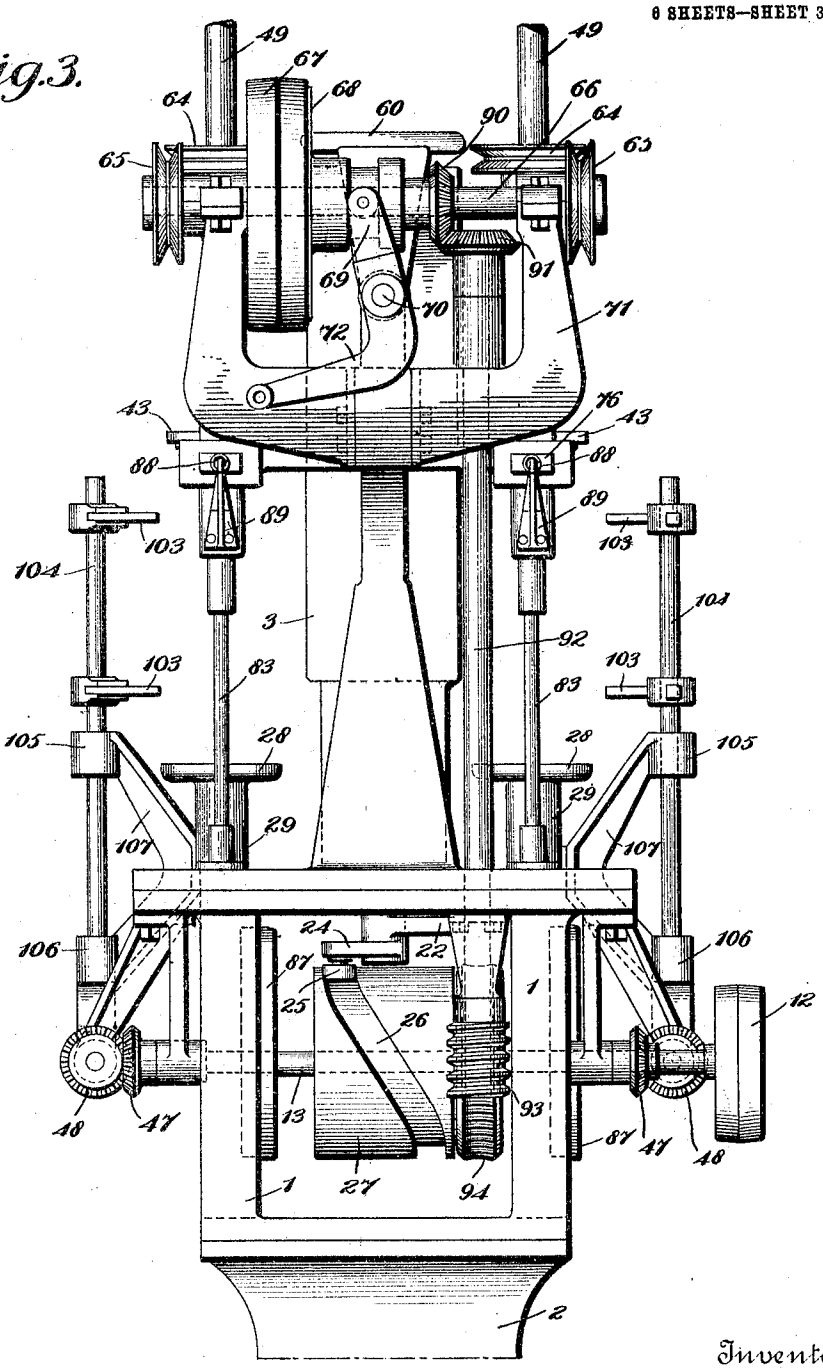
6 SHEETS—SHEET 3.

Fig. 3.



Witnesses

M. Mapp Dorrall.

A. H. Bryce

Inventor

Alden B. Starr

by Wilkinson, Fisher & Whittemore

Attorney

A. B. STARR.

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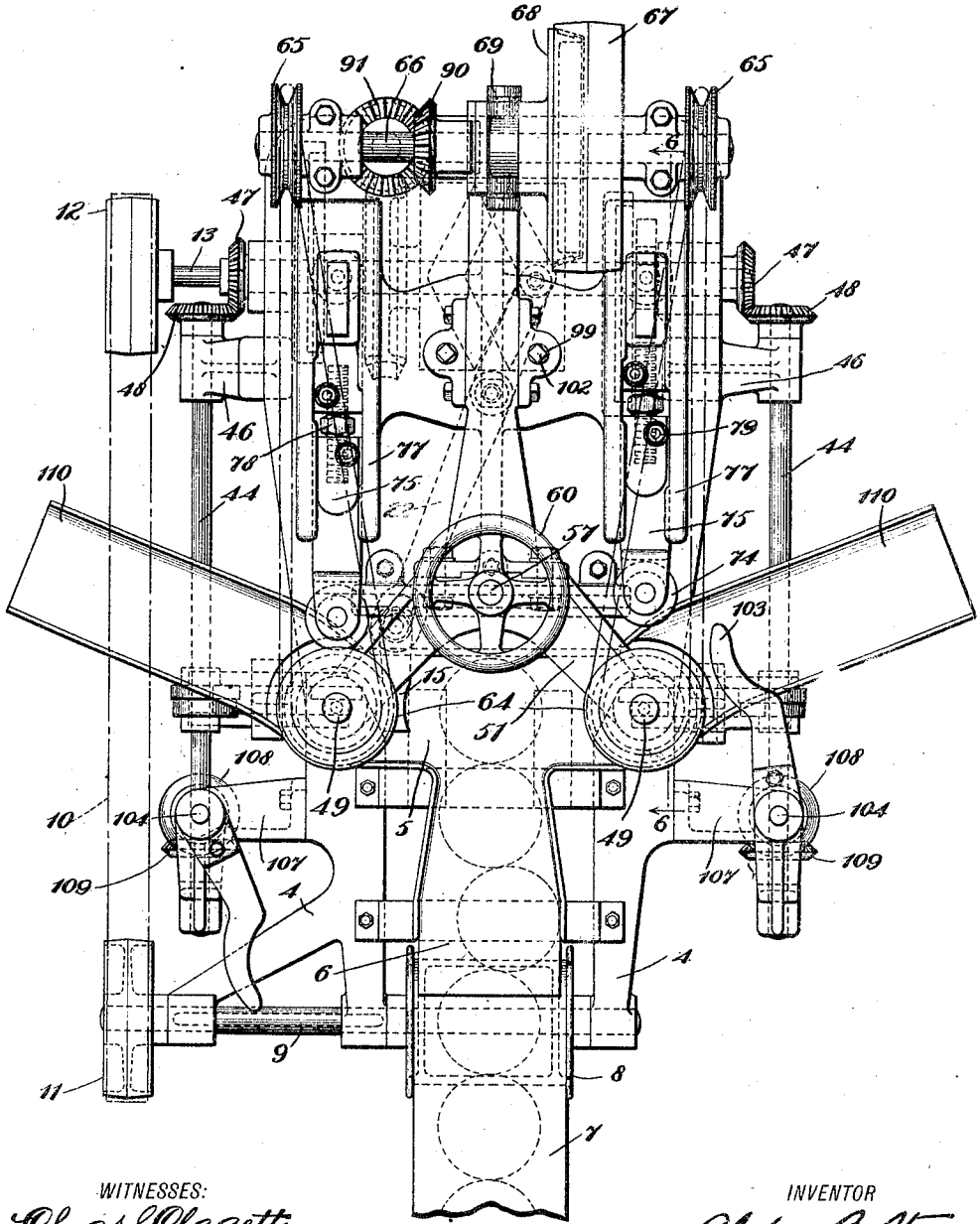
6 SHEETS—SHEET 4.

Fig. 4.



WITNESSES:

Chas. J. Clagett

N. H. Bynum

INVENTOR

Alden B. Starr

BY

Wilkinson, Fisher & Whittemore

ATTORNEY

A. B. STARR.

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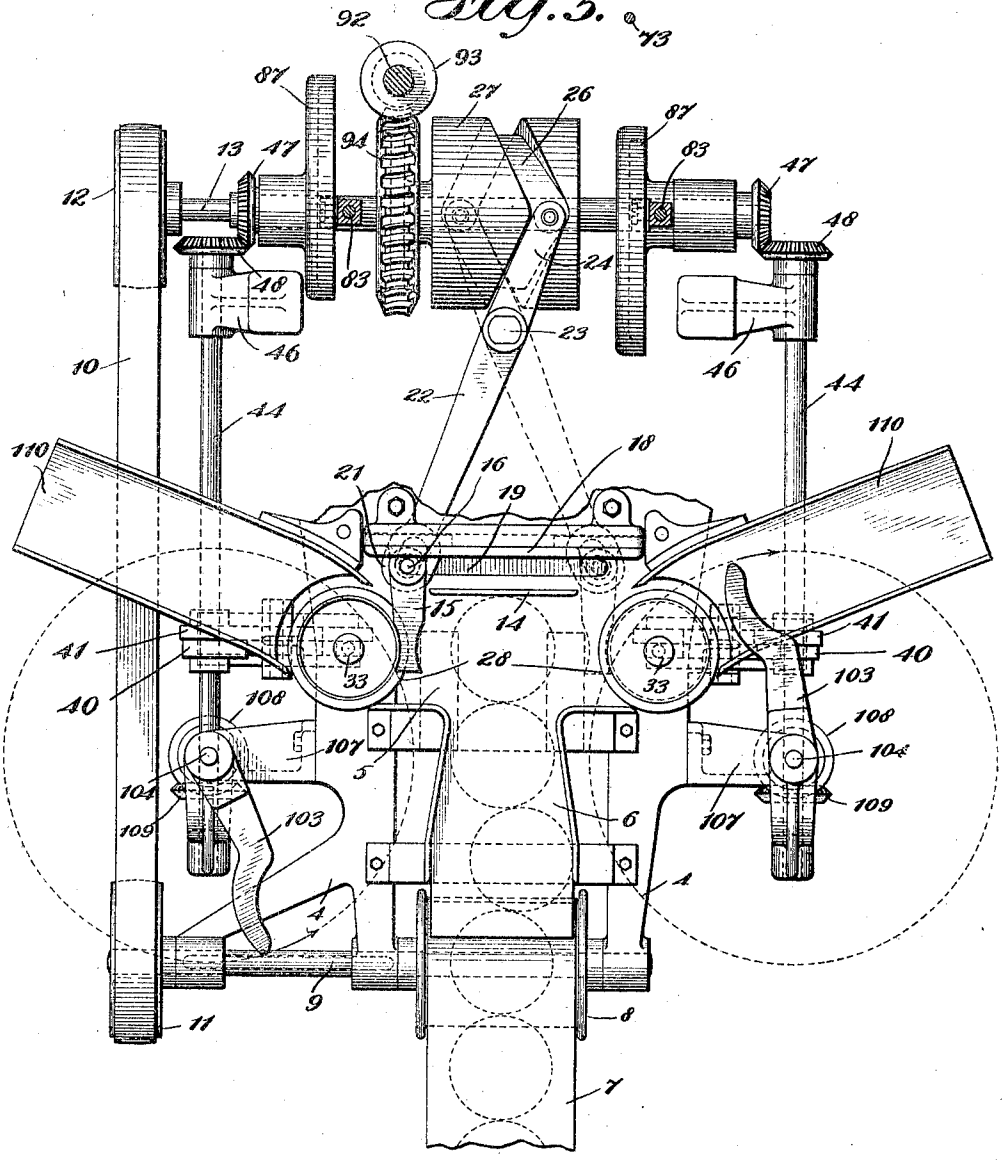
6 SHEETS—SHEET 5.

Fig. 5.



WITNESSES:

Chas. F. Clagett

H. A. Byrne

INVENTOR

Alden B. Starr

BY

Wilkinson, Fisher & Whittemore

ATTORNEY

A. B. STARR.

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6 SHEETS—SHEET 6.

Fig. 6.

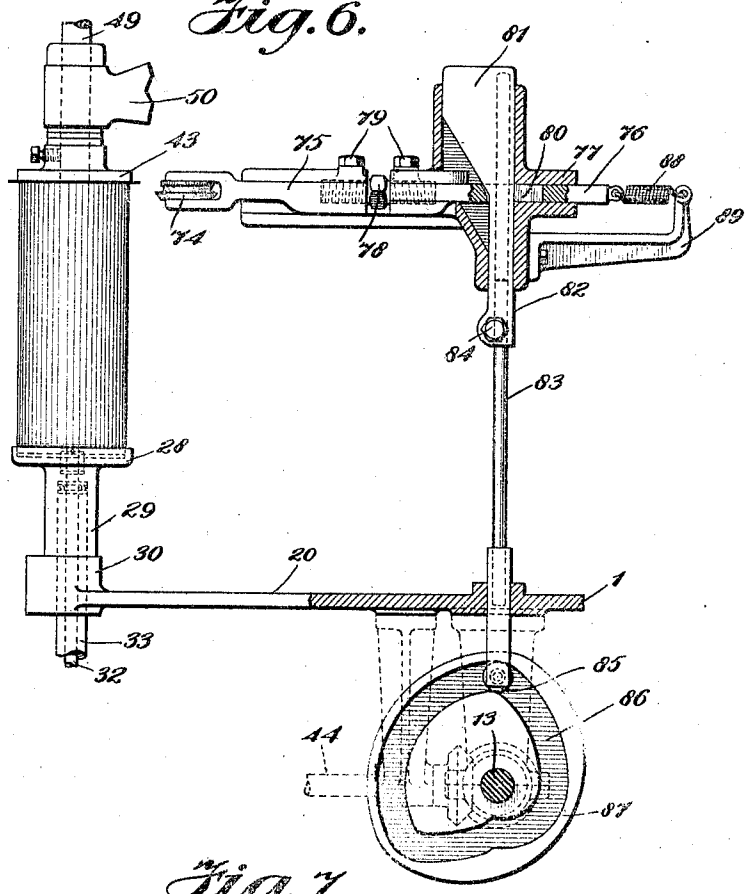
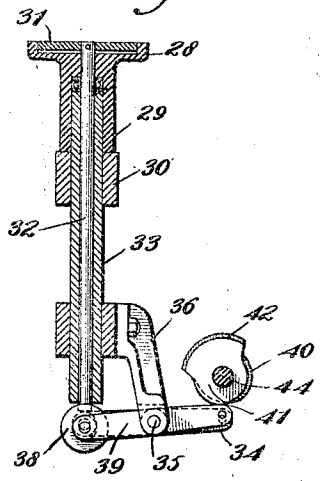


Fig. 7.



WITNESSES:

Chas. F. Clagett

N. H. Byrne

INVENTOR

Alden B. Starr

BY

Wilkinson, Fisher & Whittemore

ATTORNEY

UNITED STATES PATENT OFFICE.

ALDEN B. STARR, OF NEW YORK, N. Y., ASSIGNOR TO SINGLE SERVICE PACKAGE CORPORATION OF AMERICA, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MACHINE FOR AFFIXING CLOSURES TO VESSELS.

1,038,983. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed July 21, 1911. Serial No. 639,825.

To all whom it may concern:

Be it known that I, ALDEN B. STARR, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Affixing Closures to Vessels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to machines for applying or affixing end closures to vessels, and has as its object to produce a machine of that character wherein the vessels are continuously fed to the closure affixing mechanism, the closures affixed to the vessels, and the vessels with applied closures removed, all in one continuous and unbroken operation.

The invention further contemplates providing a closure affixing machine embodying a duplex mechanism and an arrangement for feeding the vessels, with loosely applied closures, from a constantly moving column to the two closure affixing means, thus increasing the efficiency and the general output of the machine to the end of greater economy in the manufacture of the articles.

With these and other objects in view the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 is a front view in elevation of the machine. Fig. 2 is a side view in elevation thereof. Fig. 3 is a rear view in elevation of the same, with parts omitted for the sake of clearness. Fig. 4 is a top plan view of the machine. Fig. 5 is a top plan view taken on the line 5—5 of Fig. 2. Fig. 6 is a detail side view in elevation of the closure affixing mechanism, and Fig. 7 is a vertical sectional view of the vessel support and holder and associated parts, taken on line 7—7 of Fig. 2.

Referring to the construction in detail, the machine comprises a frame 1, mounted on a suitable support or base 2, and supporting a superposed frame 3. The frame 1 is provided with two forwardly extending brackets 4, on which is mounted a tray or table 5, constructed with a trough-like section 6 designed to receive a constantly moving column of vessels in substantially that manner indicated in Fig. 4. The vessels are delivered onto the tray 5 through the medium of a conveyer belt 7, traveling about a pulley 8, that is mounted on a shaft 9 journaled in the brackets 4. The shaft 9 derives rotation from a driven belt 10, running on pulleys 11 and 12, which are mounted, respectively, on the shafts 9 and 13.

The moving column of vessels to have closures applied is brought against a stop or abutment 14 (see Fig. 5) and thence delivered alternately to the closure affixing mechanisms, one of which is disposed to either side of the tray or table 5. The means for delivering the vessels in said alternate manner consists of a pair of arms 15 secured to a vertically disposed bar 16, that is mounted on a carriage 17 that has reciprocating movement in a guideway 18 (see Figs. 2 and 5). The carriage bar 16 projects through a slot 19 in the top 20 of the frame 1, and has engagement with the slotted end 21 of a lever 22, which is mounted to oscillate on a pivot 23 secured to the under side of said frame top 20. The arm 24 of said oscillating lever has a roller 25 (see Fig. 1) designed to travel within a cam-way 26 of a drum 27, and said drum 27 is fixed to rotate with the shaft 13 (see Fig. 5). Through the mechanism just referred to, the lever 22 is oscillated and causes the arms 15 to engage the vessels with loosely applied closures, and deliver said vessels alternately to the closure affixing mechanisms.

The closure affixing mechanisms comprise each (see Figs. 6 and 7) a rotatable head or support 28, having a sleeve portion 29 that rests on a bearing surface 30, which is formed integral with the frame surface 20, and holds said support in substantially the plane of the table 5, whereby the vessels may be readily deposited thereon by the reciprocating carrier. The support 28 is recessed to receive a disk 31 and allows said disk to have a slight axial movement therein. A shaft 32 is secured to the disk 31, and extends through a sleeve 33, and at its lower end engages with one end of a lever 34 that is mounted on a pivot 35 on an arm 36, and said arm is secured to the frame 1 The

lower end of the sleeve 33 is in like manner engaged by a roller 38 on a lever 39, which is likewise pivotally mounted on the pivot 35. The levers 34 and 39 are adapted to be engaged and actuated by cam elements 40, 41 and 42, respectively. The cam elements 40 and 41 are so disposed that as soon as the carton body rests on the support 28 the disk 31 is caused to rise slightly within said body, and centers and holds the same in place. Immediately following this, both levers (34 and 39) are engaged by the cam elements 42, and cause the rod 32 and sleeve 33 to rise together and bring the loosely applied closure on the vessel into engagement with the mandrel 43, when it is crimped on the vessel by a following spinning operation. The members providing the cam elements 40, 41, and 42 are mounted to rotate with a shaft 44, that is journaled in arms 45 and 46, which are supported from the frame 1; and said shaft 44 is driven from the shaft 13 through the medium of a bevel gear 47 and 48. The mandrels 43 are mounted on shafts 49 journaled to rotate in an adjustable cross-head 50 and a fixed cross-head 51. The fixed cross-head 51 is secured by bolts 52 against the face 53 of an upward extension 54 of the superposed frame 3. The adjustable cross-head 50 is provided with bolts 55 that fit within vertical slots 56, formed in the face 53 of said frame extension 54. A screw rod 57 is journaled in a bearing 58 on the frame 3 and a similar bearing 59 on the fixed cross-head 51, and has screw-threaded engagement with a movable cross-head 50, which it is designed to adjust through the medium of said screw rod by turning the hand wheel 60 secured to said screw rod. The movable cross head 50 is secured in its adjusted position through the medium of the bolts 55 in the slots 56. The mandrel shafts 49 are each provided with fixed collars 61 and 62, through the medium of which said shafts are held against axial movement with respect to their bearings in the movable cross-head.

The mandrels are driven through the medium of ropes 63, and pulleys 64 that are splined on the mandrel shafts 49, and pulleys 65 mounted on the shaft 66, journaled in the yoke frame 71. Said shaft 66 is driven by a belt (not shown) running over a pulley 67. The said pulley 67 is loosely mounted on the shaft 66, and is adapted to be rotated therewith through the agency of a friction clutch 68 splined on said shaft, and which may be thrown into and out of engaging position by a forked lever 69 (see Fig. 3) pivoted at 70 to a yoke frame extension 71. The arm 72 of the forked lever 69 is pivotally connected to a rod 73, through the medium of which the friction clutch is adapted to be actuated.

The spinning tools, which coöperate with the rotatable mandrels 43 to crimp or otherwise secure the closures to the vessels, consist each of a grooved roller 74, that is mounted on a two-part slide 75 and 76 mounted in a casing 77, and adapted to be intermittently actuated to bring the grooved roller 74 into and out of operative position. The slide sections 75 and 76 are connected by a right and left hand threaded bolt 78, through the medium of which the degree of movement or throw of the spinning roller 74 may be adjusted; and such adjustment is made secure by a pair of set screws 79. The slide section 76 is provided with an elongated aperture 80, within which a wedge block 81 is adapted to move and cause the inward movement of said slide to bring the spinning roller 74 into coöperation with the mandrel. The wedge block 81 is constructed with a tubular stem portion 82 that receives a rod 83, which rod is designed to have adjustment in said stem, and is secured therein through the medium of the tightening bolt 84. The lower end of the rod 83 carries a roller 85 that travels within a cam way 86 of a cam disk 87 that is fixed to rotate with the shaft 13. The rotation of the disk 87 causes the spinning roller to be moved into engaging position through the medium of the wedge block 81, and for moving said spinning tool from such engaging position the tool supporting slide (75 and 76) is provided with a retraction spring 88 that is secured at one end to the slide sections 76 and at the other end to a bracket arm 89 that is mounted on the slide casing 77. The cam disks 87 are connected to be continuously driven from the driving shaft 66 through the medium of bevel gears 90 and 91 which drive a vertical shaft 92, and said shaft 92 carries a screw gear 93, engaging with a worm wheel 94 on the shaft 13 (see Figs. 2 and 3).

Through the medium of the adjustable cross-head 50 the mandrels 43 are adapted to be positioned with respect to the rotatable supports 28 to receive vessels of different lengths, and for bringing the spinning tools 74 into corresponding positions each of the casings 77 of the spinning tool slides is adapted to be adjusted on the superposed frame 3. The means for effecting this adjustment consists in a vertically disposed plate 95 having slots 96 to receive guide bolts 97 carried by the slide casing 77. A screw-threaded rod 98 is journaled in the bearings 99 and 100 on the frame 3, and has screw-threaded engagement as at 101 with the frame casing 77. Said rod 98 is constructed with a squared end 102 to receive a wrench or the like for turning said rod.

On the completion of each spinning operation it is proposed to remove the vessel

with applied closure by mechanical means and to leave the vessel support and mandrel free to receive another vessel with loosely applied closure which is delivered by the reciprocating arms 15 from the moving column delivered by the belt 7 (see Fig. 5). To this end each of the closure affixing mechanisms has associated therewith a pair of rotatable or sweep arms 103 mounted on a shaft 104 that is journaled in bearings 105 and 106 on arms 107 secured to the bracket arms 4 (see Figs. 2 and 3). Each of the shafts 104 carries at its lower end a beveled gear 108 in mesh with a similar gear 109 on the shaft 44, and from which shaft, through the gearing (108 and 109), the shaft 104 is rotated causing the arms 103 to engage with the vessel having the closure affixed and move said vessel along the trough 110, secured to the frame 3, and of which there is one disposed to either side of and in the plane of the table or tray 5.

The machine is applicable for putting on both top and bottom closures of a vessel and in the carrying out of which the vessel body with a bottom closure loosely applied thereon is carried to the machine by the belt 7, and in the manner heretofore described the bottom closure is affixed thereto when the vessel is removed. If the same vessel is again placed on the feed belt but in inverted position and with the top closure therefor loosely applied, the next operation will crimp on said top closure.

It is obvious that those skilled in the art may vary the details of construction and arrangement of parts without departing from the spirit of my invention, and therefore I do not wish to be limited to such features except as may be required by the claims.

What I claim is:—

1. In a machine for applying end closures to vessels the combination of a supporting frame; a vessel feeding mechanism; closure affixing mechanism disposed to either side of said feeding mechanism and comprising each, a rotatable support and holder; a rotatable mandrel adapted to hold the closure on the vessel, a spinning tool coöperable with said mandrel; reciprocable slides on which said spinning tools are mounted; a reciprocable carrier operable to feed the vessels to the closure affixing mechanisms alternately; an arm fulcrumed on the supporting frame and connected with said carrier; a cam engaging with and operable to oscillate said arm to reciprocate said carrier; a shaft on which said cam is mounted; cam disks mounted on said cam shaft; rods engaging with said cam disks; wedges carried by said rods and engaging with the spinning tool slides and adapted to intermittently actuate the same; means connected with the rotatable support and holders operable to release the vessels with applied closures; and rotatable arms operable to remove the released vessels, substantially as described.

2. In a machine for applying end closures to vessels the combination of a supporting frame; a vessel feeding mechanism; a tray adapted to receive the vessels; closure affixing mechanism disposed to either side of said tray and comprising each; a rotatable support having an axially movable disk adapted to engage with the vessel, a rotatable mandrel adapted to hold the closure on the vessel, a spinning tool coöperable with said mandrel; reciprocable slides on which said spinning tools are mounted; a reciprocable carrier operable to feed the vessels to said rotatable supports alternately; an arm fulcrumed on the supporting frame and connected with said carrier; a shaft journaled in the frame; a cam drum mounted on said shaft and having engagement with said arm to actuate the same; a pair of cam disks mounted on said cam drum shaft; means for rotating said cam drum shaft; rods having wedges engaging with said cam disks and the spinning tool slides and adapted to intermittently actuate said slides means for axially moving the disks of said rotatable supports to release the vessels with applied closures; and rotatable arms operable to remove the released vessels, substantially as described.

3. In a machine for applying end closures to vessels, the combination of a rotatable support having an axially movable disk; means for moving said disk axially to engage with the inner wall surface of the vessel to hold said vessel, and to bring said disk flush with the surface of the support to permit of removal of the vessel; a mandrel; a spinning tool; and means for feeding the vessels to the support and removing the same therefrom, substantially as described.

4. In a machine for applying end closures to vessels, the combination of a rotatable support having an axially movable disk adapted to engage within and hold the vessel; a rod secured to said disk; a pivotally mounted lever engaging with said rod; a cam engaging with and adapted to actuate the lever to lift the rod and raise and lower said disk; means for actuating said cam; a mandrel; a spinning tool; and means for feeding the vessels to the support and removing the same therefrom, substantially as described.

5. In a machine for applying end closures to vessels, the combination of a rotatable support having an axially movable disk; a mandrel disposed above said support; a spinning tool coöperable with the mandrel; means for guiding the vessel to said support; means for raising and lowering said

support and disk to bring the vessel into and out of engagement with the mandrel; means for moving the disk independently to engage with and release the inner wall of the vessel; and means for removing the released vessel from the support, substantially as described.

6. In a machine for applying end closures to vessels, the combination of a rotatable support; a sleeve on which said support is mounted; a disk mounted within the support; a rod secured to said disk and passing through the sleeve; a mandrel disposed above the support; a spinning tool coöperable with said mandrel; a pair of pivotally mounted levers engaging with said rod and sleeve; cams engaging with said levers and adapted to actuate the same to lift and lower said rod and sleeve and bring the vessel into and out of engagement with said mandrel; said cams disposed to effect relative movement between the rod and sleeve whereby to engage and release the vessel; and means for removing the vessels when released, substantially as described.

7. In a machine for applying end closures to vessels, the combination of a guide-way for feeding the vessels; a rotatable support for the vessels mounted adjacent said guide-way and normally maintained in the same plane therewith; a mandrel mounted above the rotatable support; means for raising said support to bring the vessel into engagement with said mandrel; a spinning tool coöperable with said mandrel; means located within the support for engaging with and holding the vessel and adapted to release the same; and means for removing the released vessel, substantially as described.

8. In a machine for applying end closures to vessels, the combination of a guide-way for feeding the vessels; a rotatable support for the vessels mounted adjacent said guide-way and normally maintained in the same plane therewith; an axially movable disk mounted within said support; a mandrel mounted above said support; means for moving said support to bring the vessel into engagement with the mandrel; means for moving said disk axially of the support to engage with and hold the vessel; said disk adapted to lie flush with the support at the end of the downward movement thereof; and a rotatable device adapted to remove the vessel from said support, substantially as described.

9. In a machine for applying end closures to vessels, the combination of a supporting frame; a vessel feeding mechanism; a cross head fixedly mounted on said frame; a cross head adjustably mounted on said supporting frame; a screw adjusting shaft journaled in said fixed cross head and having screw engagement with the adjustable cross head; shafts journaled in said cross heads; mandrels secured to said shafts; rotatable supports mounted beneath said mandrels adapted to engage with and hold the vessels; means for raising and lowering the supports to bring the vessels into and out of engagement with said mandrels; a spinning tool for each of said mandrels; reciprocable slides on which said tools are mounted; means for reciprocating said slides to bring the spinning tools into and out of working position; and means for removing the vessels from said rotatable supports, substantially as described.

10. In a machine for applying end closures to vessels, the combination of a supporting frame; a rotatable vessel support and holder mounted thereon; a vertically adjustable support mounted on said frame; a rotatable mandrel journaled in said adjustable support; a spinning tool coöperable with said mandrel; a vertically adjustable support on which said spinning tool is mounted; and means for rotating said mandrel, substantially as described.

11. In a machine for applying end closures to vessels, the combination of a rotatable vessel support and holder; a rotatable mandrel disposed above said support; a spinning tool coöperable with said mandrel; a reciprocable slide on which said spinning tool is mounted; said slide comprising a laterally adjustable section whereby to vary the extent of throw of the spinning tool; a wedge engaging with said slide; a rod adjustably connected to said wedge; a cam disk engaging with and adapted to actuate the rod to move the spinning tool into position; a retraction spring connected to said slide; means for actuating the rotatable support and cam disk; and means for releasing the vessel on the completion of the operation, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

ALDEN B. STARR.

Witnesses:
J. H. GEWECKE,
H. S. RODGERS.