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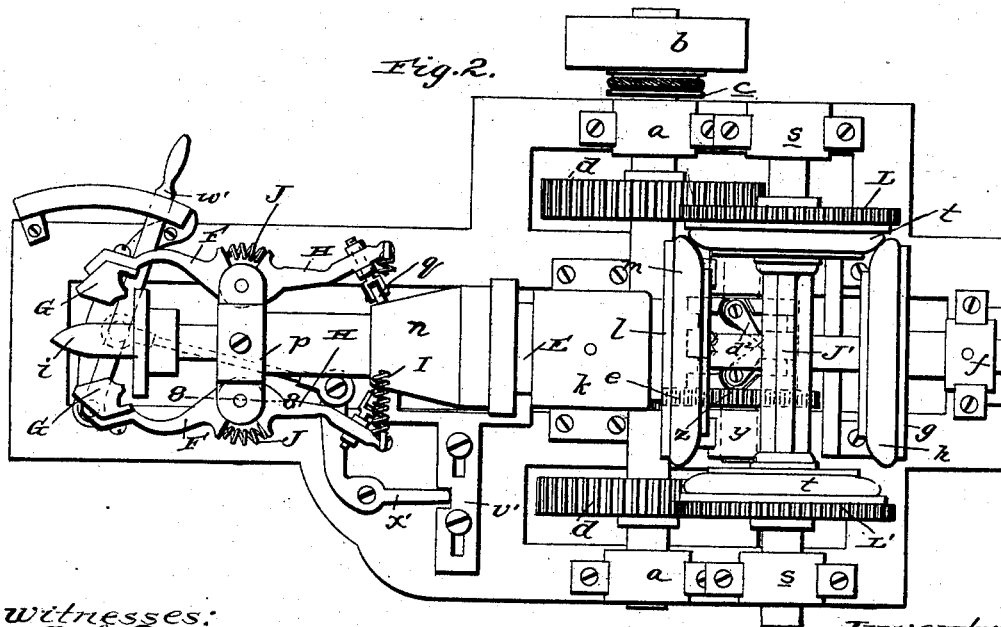
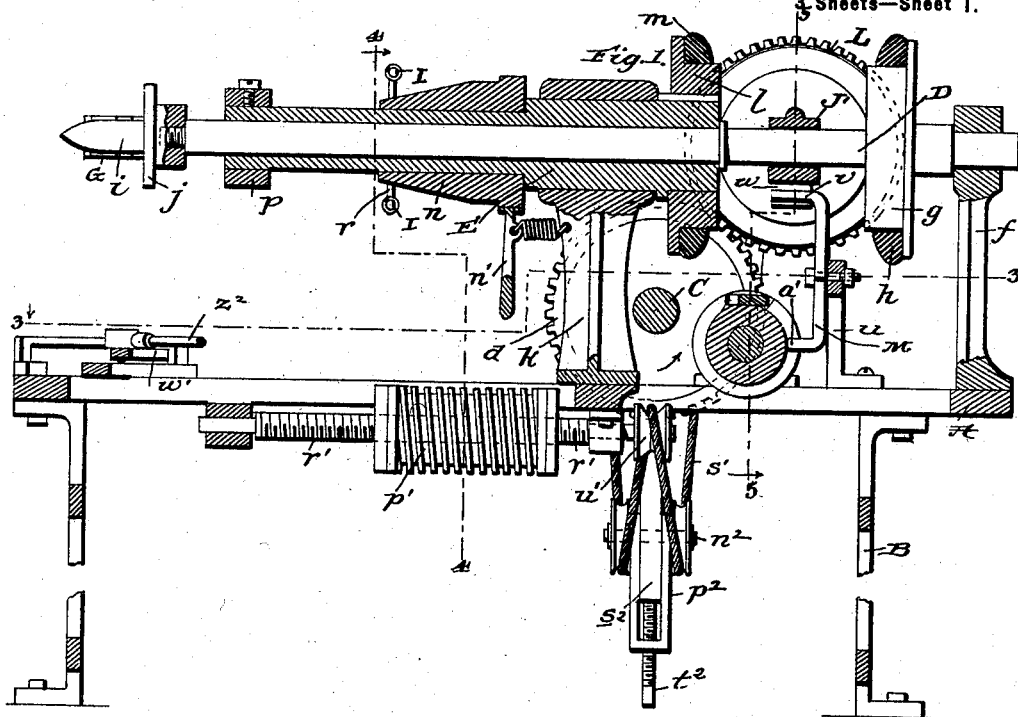
Patented Apr. 10, 1900.

R. P. WOODILL.
MACHINERY FOR MANUFACTURING BOTTLES.

(Application filed Apr. 28, 1899.)

(No Model.)

3 Sheets—Sheet 1.



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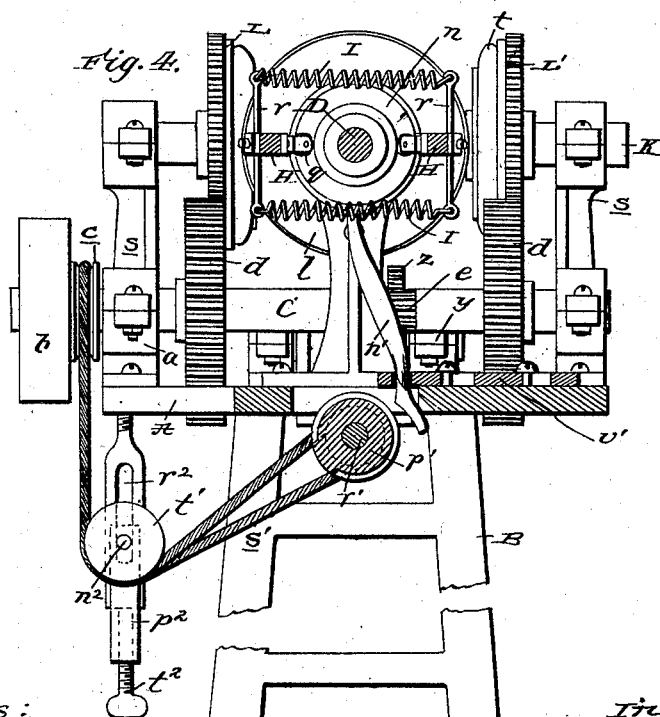
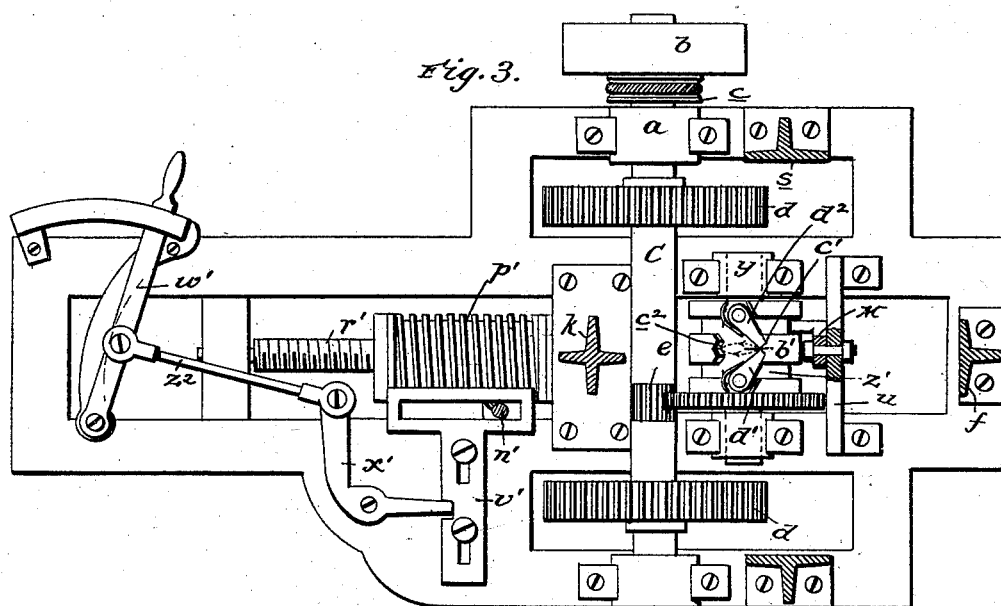
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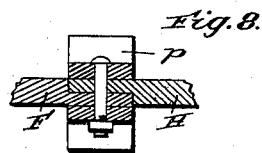
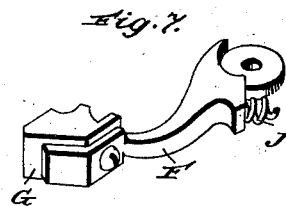
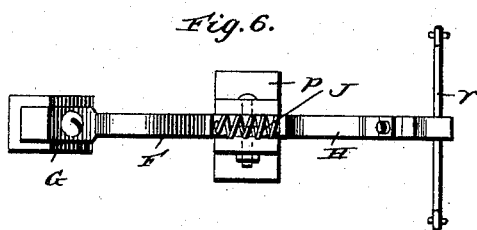
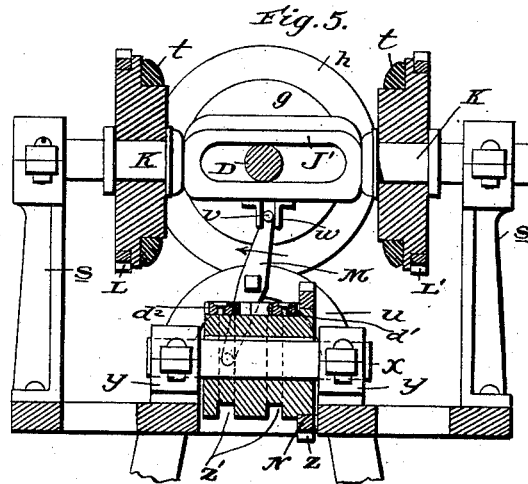
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

ROBERT PICKREN WOODILL, OF WINNIPEG, CANADA.

MACHINERY FOR MANUFACTURING BOTTLES.

SPECIFICATION forming part of Letters Patent No. 647,352, dated April 10, 1900.

Application filed April 28, 1899. Serial No. 714,929. (No model.)

To all whom it may concern:

Be it known that I, ROBERT PICKREN WOODILL, a citizen of the Dominion of Canada, residing at Winnipeg, in the Province of Manitoba and Dominion of Canada, have invented new and useful Improvements in Machines for the Manufacture of Bottles, of which the following is a specification.

My invention relates to machines for finishing the necks of bottles—*i. e.*, forming heads upon and smoothing the same. It contemplates the provision of a machine in which a centering-guide and a filler revolving in one direction operate in conjunction with dies revolving in the opposite direction, the direction of movement of the guide and filler and the dies being automatically reversed about every two and a half revolutions, whereby twisting of the necks of bottles is prevented and a perfectly-smooth finish thereof is attained.

Other advantageous features of the invention will be fully understood from the following description and claims when taken in conjunction with the annexed drawings, in which—

Figure 1 is a vertical longitudinal central section of my improved machine with some of the parts in elevation. Fig. 2 is a top plan view. Figs. 3 and 4 are sections taken in the planes indicated by the broken lines 3 3 and 4 4, respectively, of Fig. 1. Fig. 5 is a detail transverse section taken in the plane indicated by the broken line 5 5 of Fig. 1. Fig. 6 is a detail side elevation illustrating one of the die-carrying jaws and the die thereon, together with the complementary lever of said jaw and the spring interposed between the two. Fig. 7 is a perspective view of one of the die-carrying jaws and the die thereon. Fig. 8 is a transverse section taken in the plane indicated by broken line 8 8 of Fig. 2.

In the said drawings similar letters designate corresponding parts in all of the several views, referring to which—

A is the bed of my improved machine, which is preferably of the general shape shown and is mounted upon legs B.

C is a transversely-disposed drive-shaft, which is journaled in standards *a*, rising from

bed A, and is equipped with a band-pulley *b*, a grooved pulley *c*, two gear-wheels *d*, and a pinion *e*.

D is a longitudinally-disposed shaft which is journaled in a standard *f*, rising from the bed A, and is provided with a fast friction-wheel *g*, bearing a rubber annulus *h*. Said shaft is also provided with a centering-guide *i* and a filler or filling-flange *j*, the latter being preferably formed integral with the guide, which is screwed on or otherwise fixed to the shaft, so as to turn therewith.

E is a tubular shaft or sleeve loosely mounted on the shaft D and journaled in a standard *k*, rising from bed A. This sleeve is provided with a fast friction-wheel *l*, having a rubber annulus *m*, and is also provided with a loose and endwise-movable cone *n*, the purpose of which will be presently explained.

F F are jaws fulcrumed in brackets *p*, extending laterally from the forward end of the sleeve E.

G G are dies which are detachably connected by screws or other suitable means to the jaws and are designed, in conjunction with the guide *i* and filler *j*, to form a head on a bottle-neck.

H H are levers fulcrumed at their forward ends in the brackets *p* and having antifriction-wheels *q* at their rear ends, designed to engage the cone *n*.

I I are transverse springs which are interposed between and connected to bars *r* at the rear ends of the levers H and are designed to hold the wheels *q* against the cone *n*, and J J are coiled springs interposed between the adjacent ends of the jaws and levers and having for their purpose to yieldingly press the dies on the former against the bottle-neck that is being operated on.

By virtue of the construction thus far described the shaft D, together with the guide *i* and filler *j*, may be rotated in one direction, and the tubular shaft or sleeve E and its appurtenances may be simultaneously rotated in the opposite direction. The cone *n* is also free to be moved endwise, forward, and backward. When the shaft D is rotating in one direction and the shaft or sleeve E in the opposite direction and the cone *n* is moved for-

ward to press the dies G against a bottle-neck mounted on the guide *i*, the filler *j* operates to press the glass at the end of the bottle-neck into the depressions of the dies, so as to
 5 form a bead and at the same time smoothes and finishes said end of the neck. The rotation of the dies G in one direction and the simultaneous rotation of the guide *i* and filler *j* in the opposite direction results in the quick
 10 formation of a bead upon the end of a bottle-neck and expedites the finishing of the said end. Such rotation of the parts mentioned in opposite directions tends, however, to twist the necks of the bottles operated upon. To
 15 overcome this objection, I provide mechanism intermediate of the drive-shaft C and the shaft D and sleeve E, whereby said shaft D and sleeve E are simultaneously rotated in opposite directions and are reversed at frequent intervals. This mechanism comprises
 20 a transversely-movable slotted block J', which loosely receives the shaft D, arbors K, connected to said block and extending through standards *s*, rising from the bed A, gear-wheels L L', loosely mounted on the arbors
 25 K and having teeth intermeshed with those of the gear-wheels *d* and also having friction-rings *t*, of rubber or other suitable material, a lever M, fulcrumed at an intermediate point
 30 of its length on a support *u*, rising from bed A, and having an angular arm *v* at its upper end (see Fig. 1) interposed between two lugs *w* on the block J', and a gear N, which is mounted on a shaft *x*, arranged in standards *y*, rising from bed A. The said gear is
 35 provided with teeth *z*, which are intermeshed with those of the pinion *e* of drive-shaft C. It is also provided with two parallel peripheral grooves *z'*, designed to alternately receive an angular branch *a'* at the lower end of the lever
 40 M, a passage *b'* connecting the parallel grooves, seats *c'* *c''* at opposite sides of said passage, and pivoted spring-pressed switches or switch-points *d'* *d''*, which control the passage *b'* and
 45 have their outer ends normally arranged in the seats *c'*, as shown in Fig. 3. The parts are shown in Fig. 5 with the lower angular branch *a'* of the lever M in the left-hand groove *z'* of the gear N and the friction-ring *t* of the gear-wheel L in
 50 engagement with the friction-wheels *g* and *l* on the shaft D and sleeve E, respectively. From this it follows that when the drive-shaft C is rotated in the direction indicated by the arrow in Fig. 1 the shaft D and sleeve E will
 55 be rotated in opposite directions until the branch *a'* of the lever M engages the switch-point *d'* and presses the same back into the seat *c''* and passes into the right-hand groove *z'* of gear N. When the said branch *a'* of lever M takes the course mentioned, the said lever is rocked in the direction indicated by
 60 arrow in Fig. 5, with the result that the gear L is carried out of and the gear L' is carried into engagement with the gears *g* *l*, and the direction of rotation of both shaft D and
 65 sleeve E is reversed. Such latter movements

of the shaft D and sleeve E continue until the branch *a'* of lever M is engaged and guided by the switch-point *d''* back into the left-hand groove *z'* of gear N, when the direction of rotation of said shaft and sleeve is again reversed. The frequent automatic reversing of the direction of movement of the shaft D and sleeve E serves, as stated, to prevent twisting of the necks of the bottles operated on and also serves to insure a perfectly-smooth finish of the ends of the bottles, which is a desideratum in this class of devices.

Fixedly connected to and depending from the cone *n* is an arm *n'*, which has its lower end shaped to engage a worm-screw *p'*, screwed on or otherwise fixed to a shaft *r'*, journaled in bearings at the under side of the bed A. The said shaft *r'*, and hence the screw *p'*, are
 85 rotated during the operation of the machine through the medium of a belt *s'*, which passes around the pulley *c* on the drive-shaft, under idler-pulleys *t'*, and around a pulley *u'* on shaft *r'*. In order to enable the attendant of
 90 the machine to move the arm *n'* into engagement with the worm-screw *p'*, and thereby cause the cone *u* to move forwardly and press the dies G against a bottle-neck on the guide
 95 *i*, I provide the transversely-movable slotted plate *v'*, which loosely receives the said arm *n'* and is adjustably connected to the bed A, and means for shifting said plate. Such means comprises a hand-lever *w'*, a bell-crank
 100 lever *x'*, and a link *z''* interposed between and connecting the hand and bell-crank levers, all as best shown in Fig. 3. When the hand-lever *w'* is released subsequent to the forward movement of the cone *u*, the cone and the parts connected with the same are returned to their normal positions through the medium of a coiled spring *w''*, interposed between the arm *n'* and one of the standards, as shown.

For the purpose of enabling the machine-attendant to readily take up slack of the belt *s'* the shaft *n''*, bearing the idler-pulleys *t'*, is journaled in a yoke *p''* and passed through a slot *r''* in a hanger *s''*, straddled by the yoke, and a screw *t''* is mounted in the lower end of the yoke and arranged to bear against the hanger, as shown. By simply turning said screw the belt *s'* may be tightened or loosened, as desired.

It will be noticed from the foregoing that the guide *i* may be readily removed from shaft D and the dies G may be readily removed from the jaws F to give place to larger or smaller guides and dies, according to the size of the bottle-neck to be operated on.

I have entered into a specific description of the construction and relative arrangement of the parts embraced in the present embodiment of my invention in order to impart a full, clear, and exact understanding of the same. I do not, however, desire to be understood as confining myself to such specific con-

struction of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my invention.

Having thus described my invention, what I claim is—

1. In a machine for finishing the necks of bottles, the combination of concentric shafts, dies carried by one of said shafts for finishing the exterior of a bottle-neck, means for rotating the shafts in opposite directions, and automatic means for reversing the direction of rotation of both shafts at intervals, substantially as specified.

2. In a machine for finishing the necks of bottles, the combination of oppositely-rotating concentric shafts, dies carried by one of said shafts for finishing the exterior of a bottle-neck, a centering-guide carried by the other shaft, means for rotating the shafts in opposite directions, and automatic means for reversing the direction of rotation of both shafts at intervals, substantially as specified.

3. In a machine for finishing the necks of bottles, the combination of concentric shafts, finishing-dies carried by one of said shafts, a drive-shaft, mechanism operated by the drive-shaft for rotating the concentric shafts in opposite directions, and mechanism operated by the drive-shaft for reversing the direction of rotation of both concentric shafts at intervals, substantially as specified.

4. In a machine for finishing the necks of bottles, the combination of concentric shafts, pivoted jaws carried by one of the shafts, dies carried by said jaws, levers carried by said shaft, and springs interposed between the levers and jaws, substantially as specified.

5. In a machine for finishing the necks of bottles, the combination of concentric shafts, pivoted jaws carried by one of the shafts, dies carried by said jaws, levers carried by said shaft, springs interposed between the levers and jaws, one or more springs connecting the rear ends of the levers, and a tapered and endwise-movable cone mounted on the same shaft as the levers and adapted to press the rear ends thereof in opposite directions, substantially as specified.

6. In a machine for finishing the necks of bottles, the combination of concentric shafts provided with friction-wheels, a drive-shaft provided with gear-wheels, a support movable transverse the length of the concentric shafts, combined gear and friction wheels mounted on said support and intermeshed with the gear-wheels of the drive-shaft and adapted to alternately engage the friction-wheels of the concentric shafts, and means operated by the drive-shaft for moving the said support at intervals, substantially as specified.

7. In a machine for finishing the necks of bottles, the combination of concentric shafts provided with friction-wheels, a drive-shaft provided with gear-wheels, a support movable transverse the length of the concentric shafts, combined gear and friction wheels mounted on said support and intermeshed with the gear-wheels of the drive-shaft and adapted to alternately engage the friction-wheels of the concentric shafts, a gear intermeshed with the drive-shaft and having peripheral grooves and a space connecting the same and also having spring-pressed switches arranged in said space, and a lever fulcrumed at an intermediate point of its length and having its lower arm arranged in engagement with said gear and its upper arm arranged in engagement with the said support, substantially as specified.

8. In a machine for finishing the necks of bottles, the combination of oppositely-rotating concentric shafts, a drive-shaft, jaws mounted on one of the concentric shafts and carrying dies, levers fulcrumed on said shaft, springs interposed between the jaws and levers, a tapered cone arranged on said shaft and having an arm, a worm-screw operated by the drive-shaft, and a handle connected with the arm of the cone and adapted to move the same into engagement with the worm-screw, substantially as specified.

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