No. 631,583. Patented Aug. 22, 1899.

A. J. RUDOLPH.

MACHINE FOR FORMING BOTTLE NECKS.

(Application filed Jan. 11, 1899.)

(No Model.) 3 Sheets—Sheet 1.

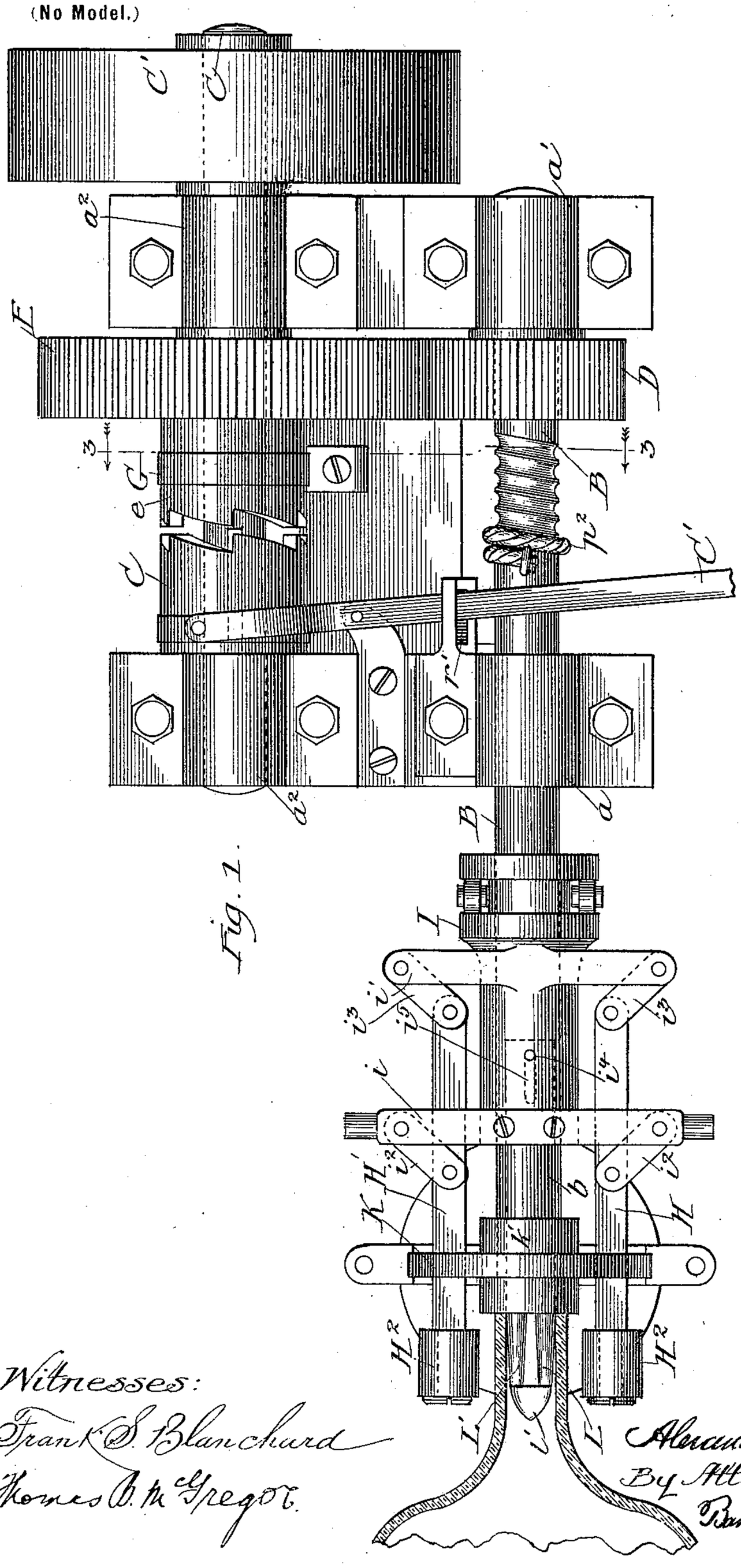

Fig. 1.

Witnesses:
Frank S. Blanchard
Howes B. McGregor.

Inventor:
Alexander J. Rudolph.
By Attorneys.
Banning & Banning & Sheridan

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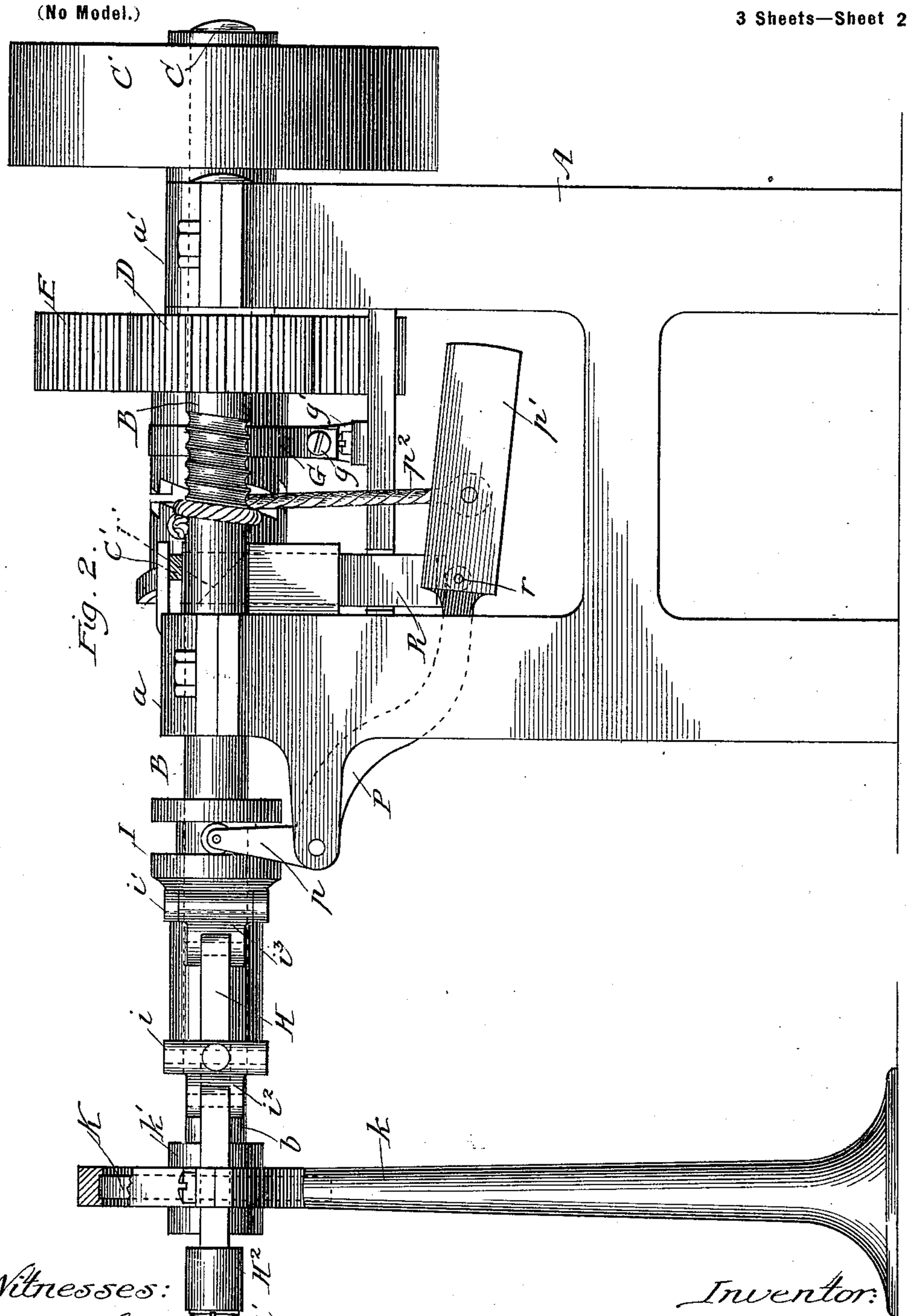

Fig. 2.

Witnesses:
Frank S. Blanchard
Thomas B. McGregor.

Inventor:
Alexander J. Rudolph.
By Attorneys
Banning & Banning & Howson

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A. J. RUDOLPH.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

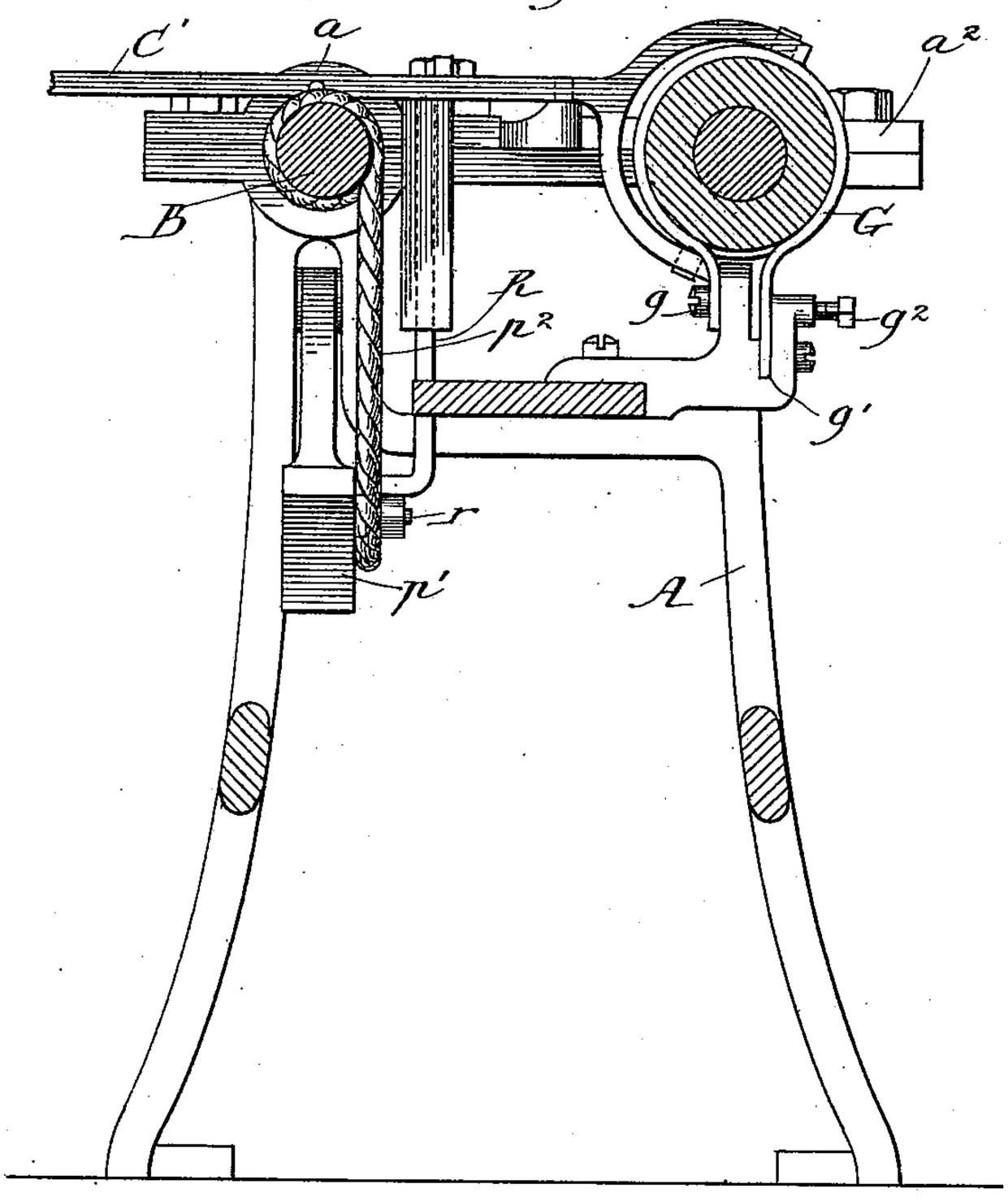
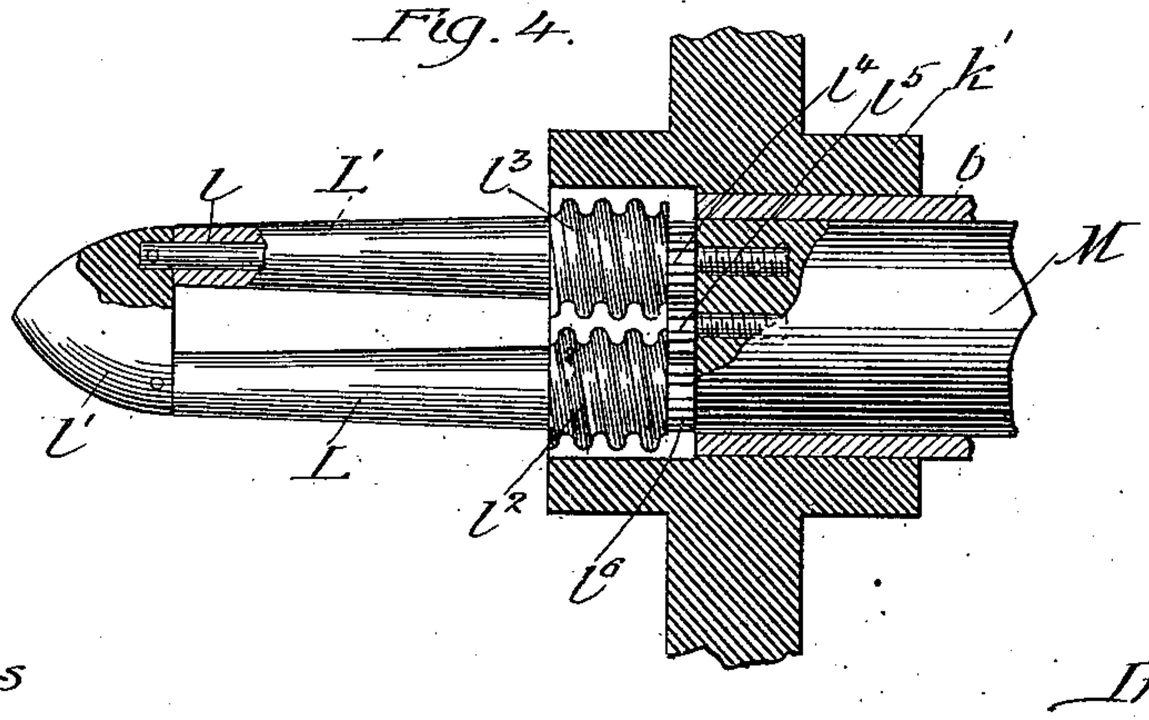


Fig. 4.



Witnesses
Frank S. Blanchard
Thomas B. McGregor.

Inventor:
Alexander J. Rudolph.
By Attorneys
Banning & Banning & Shroeder

UNITED STATES PATENT OFFICE.

ALEXANDER J. RUDOLPH, OF CHICAGO, ILLINOIS.

MACHINE FOR FORMING BOTTLE-NECKS.

SPECIFICATION forming part of Letters Patent No. 631,583, dated August 22, 1899.

Application filed January 11, 1899. Serial No. 701,831. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER J. RUDOLPH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Forming Bottle-Necks, of which the following is a specification.

The object of my invention is to provide a simple, economical, and efficient machine for forming bottle-necks; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of a machine constructed in accordance with my improvements and looking at it from the top; Fig. 2, a side elevation of the same; Fig. 3, a cross-sectional elevation taken on line 3 of Fig. 1, looking in the direction of the arrow; and Fig. 4, an enlarged longitudinal sectional view of the forming-plug.

In constructing a machine in accordance with my improvements I make a frame portion A of the desired size, shape, and strength to hold the operative and other parts in position. Rotatably mounted in boxes a and a' is a mandrel or spindle B, which supports and rotates the forming mechanisms. In order to rotate this mandrel, a driving-shaft C is provided, having a driving-pulley C′ mounted thereon provided with a reciprocating clutch c, which is adapted to be moved by a hand-lever c'. This driving-spindle is also rotatably mounted in boxes a^2 on the main frame of the machine.

In order to transmit power and motion from the driving-spindle to the rotatable mandrel, a gear-pinion D is provided and secured to the rotatable mandrel, so as to be engaged with a gear-wheel E, loosely mounted on the driving-spindle. This gear-wheel has a hub portion provided with a free clutch e, adapted to be engaged by the reciprocating clutch c on the driving-spindle, so that when such engagement is made the clutch mechanism and train of gears transmit power and motion from the driving-spindle to the rotatable mandrel. A spring-brake G is provided and secured to the frame of the machine by means of a screw g, having one end g' free, so that a set-screw g^2 may be used to regulate the amount of friction on the hub of the gear-wheel. This arrangement is for the purpose of preventing the mechanism from having any extended rotation after the clutch mechanisms have been disengaged.

To size, shape, and finish the bottle-neck, I provide a pair of parallel moving bars H and H′, which are connected with an operating-sleeve I by means of lugs i and i' and links i^2 and i^3, so that as the operating-sleeve is moved backwardly and forwardly on the rotatable mandrel the parallel bars are moved inwardly and outwardly toward or away from the axis of the rotatable mandrel. These parallel bars are prevented from being moved longitudinally by means of a disk K, which is rotatably mounted on a standard k, the parallel bars being recessed to move in slots (not shown) in said disk. The disk is also provided with a hub portion k', which surrounds and is mounted upon a tubular extension b of the rotatable mandrel. Each parallel bar is provided with a forming-roll H^2 for the purpose of contacting the bottle-neck and sizing or shaping the exterior surface thereof.

In order to size and shape the interior surface of the bottle-neck and provide it with a threaded opening, a forming-plug is provided, which is preferably made of two rotatable rolls L and L′, mounted upon rods l, which are secured together by means of a cap l', which is elliptical in cross-section. The rods l are also secured in a reciprocating cylindrical block M, which is slidingly mounted in the axial opening of the tubular extension B of the rotatable spindle, and the rolls of the forming-plug are provided with raised helical portions l^2 and l^3, connected together so as to have rotation in a similar manner by means of a train of gears l^4, l^5, and l^6 when contacted by the material of the bottle-neck.

To move the forming-plug forwardly, the operating-sleeve is provided with a pin i^4, which passes through an elongated opening i^5 in the rotatable spindle and a similar though shorter opening in the forming-plug block, the operations being such that as the operating-sleeve is being moved forwardly the forming-rolls on the parallel bars are first moved so as to contact the bottle-neck. By this time the pin i^4 has reached the limit of its movement in the forming-plug block and carries such block and plug mechanism forward with it, so as to carry the threaded portions of the rolls into the openings of the bottle-neck to size, shape, and finish the same.

In order to accomplish these operations automatically, an operating pivoted lever P is provided, which has a yoke portion p engaging with the operating-sleeve and its opposite free end p' engaged with the rotatable mandrel by means of a cord or cable p^2. A cam-block or similar element R is provided and slidingly mounted in the frame portion, so as to be contacted by a roll r on the operating-lever. The upper part of this cam-block is chamfered, as at r', and adapted to contact the hand-lever C, as shown particularly in Fig. 1, and operate such lever, so as to disengage the clutch mechanism in such figure.

In operation the driving-spindle is started and the hand-lever moved so as to engage the clutch mechanisms. The bottle in a ductile and heated condition is placed in engagement with the parts, as shown in Fig. 1. The rotatable mandrel being started raises the operating-lever, so as to move the operating-sleeve forwardly and force the forming-rolls into contact with the exterior of the bottle-neck. When this operation has started, the operating-sleeve through the medium of its pin i^4 moves the forming-plug forward and finishes the interior of the bottle-neck. When these operations have been completed, the cam-block has been raised so as to contact the hand-lever, move it in the opposite direction, and disengage the clutch mechanism, as shown in Fig. 1, while the band or spring brake G stops the further rotation of the rotatable mandrel.

I claim—

1. In a machine of the class described, the combination of a rotatable mandrel, mechanism arranged to be operated thereby to size and shape the exterior of a bottle-neck, and a forming-plug provided with two or more rolls having threaded portions thereon to size and give the interior of a bottle-neck a threaded surface, substantially as described.

2. In a machine of the class described, the combination of a rotatable mandrel provided with an axial opening, an operating-sleeve slidingly mounted thereon, roll mechanism adapted to be moved by the operating-sleeve to contact a bottle-neck and size and shape the exterior thereof, a sliding plug or block mounted in an axial opening of the rotatable mandrel and provided with rolling mechanism on the front portion thereof, having a raised threaded portion or portions to size and give the interior of a bottle-neck a threaded surface, and means interposed between the operating-sleeve and the sliding plug to operate the same, substantially as described.

3. In a machine of the class described, the combination of a rotatable mandrel provided with an axial opening, an operating-sleeve slidingly mounted thereon, parallel moving bars arranged to be operated toward or from the center of the spindle in a parallel manner by the reciprocations of the operating-sleeve, a roll on each of the parallel bars to size and shape the exterior of a bottle-neck, a sliding plug in the axial opening of the rotatable mandrel provided with two rolls having threaded portions to size and give the interior of a bottle-neck a threaded surface, toothed pinions on such rolls engaging with each other to rotate them in the same direction, and means interposed between the operating-sleeve and the sliding plug to operate the same, substantially as described.

4. In a machine of the class described, a rotatable mandrel provided with mechanism to size and shape the exterior and interior of a bottle-neck, in combination with a toothed pinion on such mandrel, a driving-spindle, a gear loosely mounted on such driving-spindle and engaging with the pinion on the rotatable mandrel, clutch mechanism adapted to engage the driving-spindle with the gear-wheel to transmit power and motion from the driving-spindle to the rotatable mandrel, a pivoted operating-lever engaging with the forming mechanism on the rotatable mandrel to operate the same, a cord or cable engaging with the pivoted operating-lever and the rotatable mandrel and adapted to be wound around the latter to operate the lever, a hand-lever engaging with the clutch mechanism to operate the same, and means interposed between the pivoted lever and the hand-lever and adapted to be operated by the pivoted lever to move the hand-lever and disengage the clutch mechanism, substantially as described.

5. In a machine of the class described, a rotatable mandrel provided with mechanism to size and shape the exterior and interior of a bottle-neck, in combination with a toothed pinion on such mandrel, a driving-spindle, a gear loosely mounted on such driving-spindle and engaging with the pinion on the rotatable mandrel, clutch mechanism arranged on the driving-spindle and the gear-wheel adapted to be engaged or disengaged to transmit power and motion from the driving-spindle to the rotatable mandrel, a pivoted operating-lever engaging with the forming mechanism on the rotatable mandrel to operate same, a cord or cable engaging with the pivoted operating-lever and the rotatable mandrel and adapted to be wound around the latter to operate the lever, a hand-lever engaging with the clutch mechanism to operate the same, a cam-block or similar element interposed between the pivoted lever and the hand-lever and adapted to be operated by the pivoted lever to move the hand-lever and disengage the clutch mechanism, and a brake engaging with the frame of the machine and the gear-wheel to furnish frictional resistance and prevent such wheel from rotating when the clutch mechanisms are disengaged, substantially as described.

ALEXANDER J. RUDOLPH.

Witnesses:
THOMAS F. SHERIDAN,
THOMAS B. MCGREGOR.