No. 648,943. Patented May 8, 1900.

O. J. GARLOCK.

MACHINE FOR FORMING GASKETS.

(Application filed Jan. 31, 1898.)

(No Model.) 5 Sheets—Sheet 1.

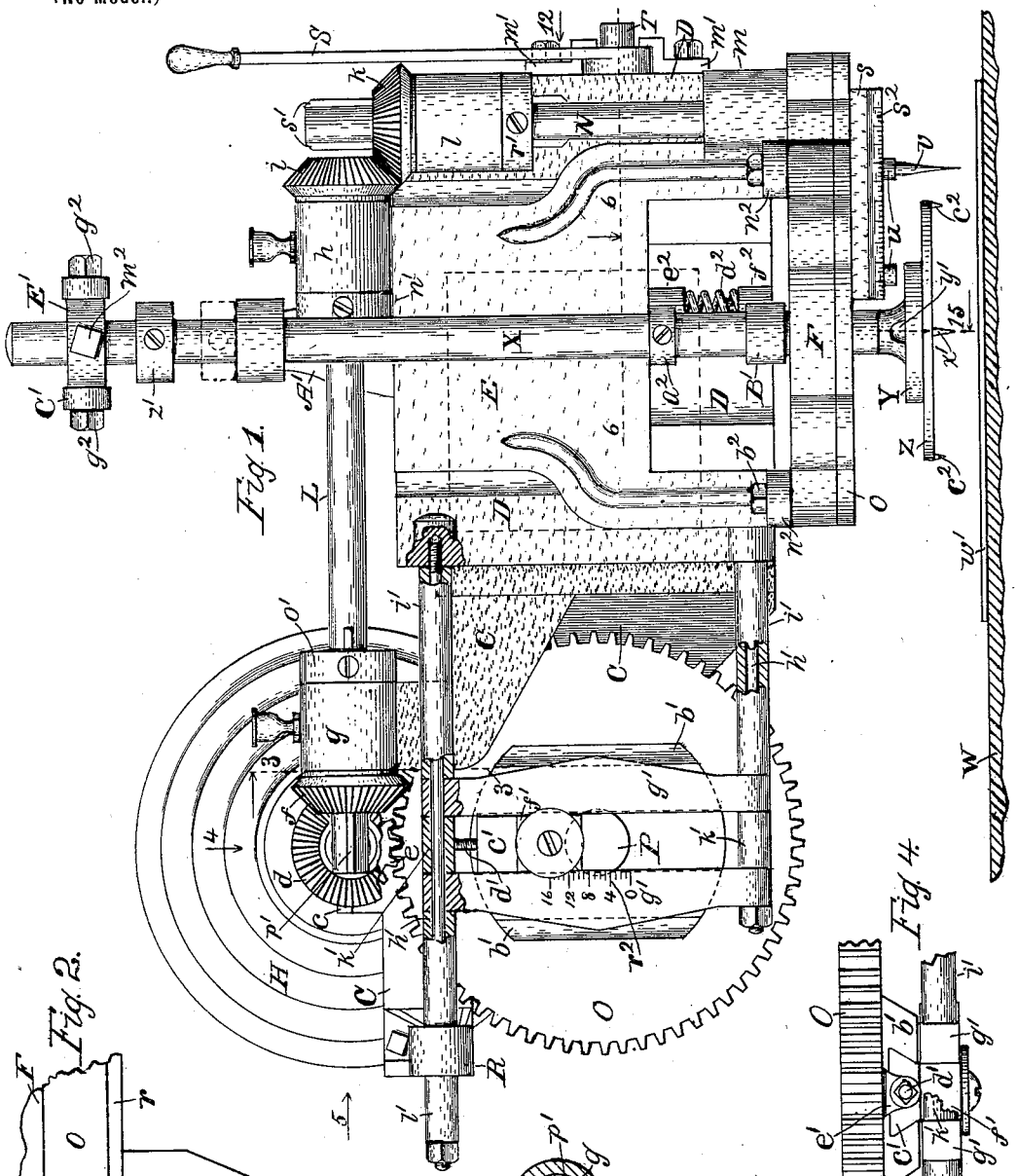


Fig. 1.

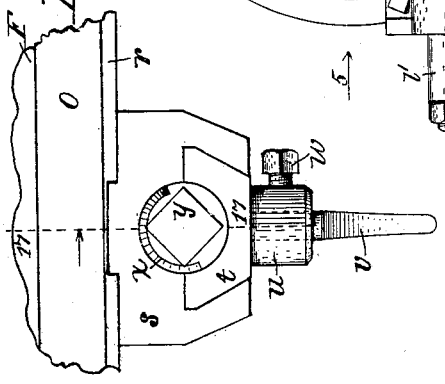


Fig. 2.

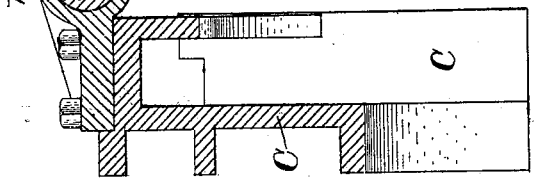


Fig. 3.

Fig. 4.

Attest:
M. L. Winston.
M. D. Phillips.

Inventor:
O. J. Garlock,
By E. B. Whitmore,
Atty.

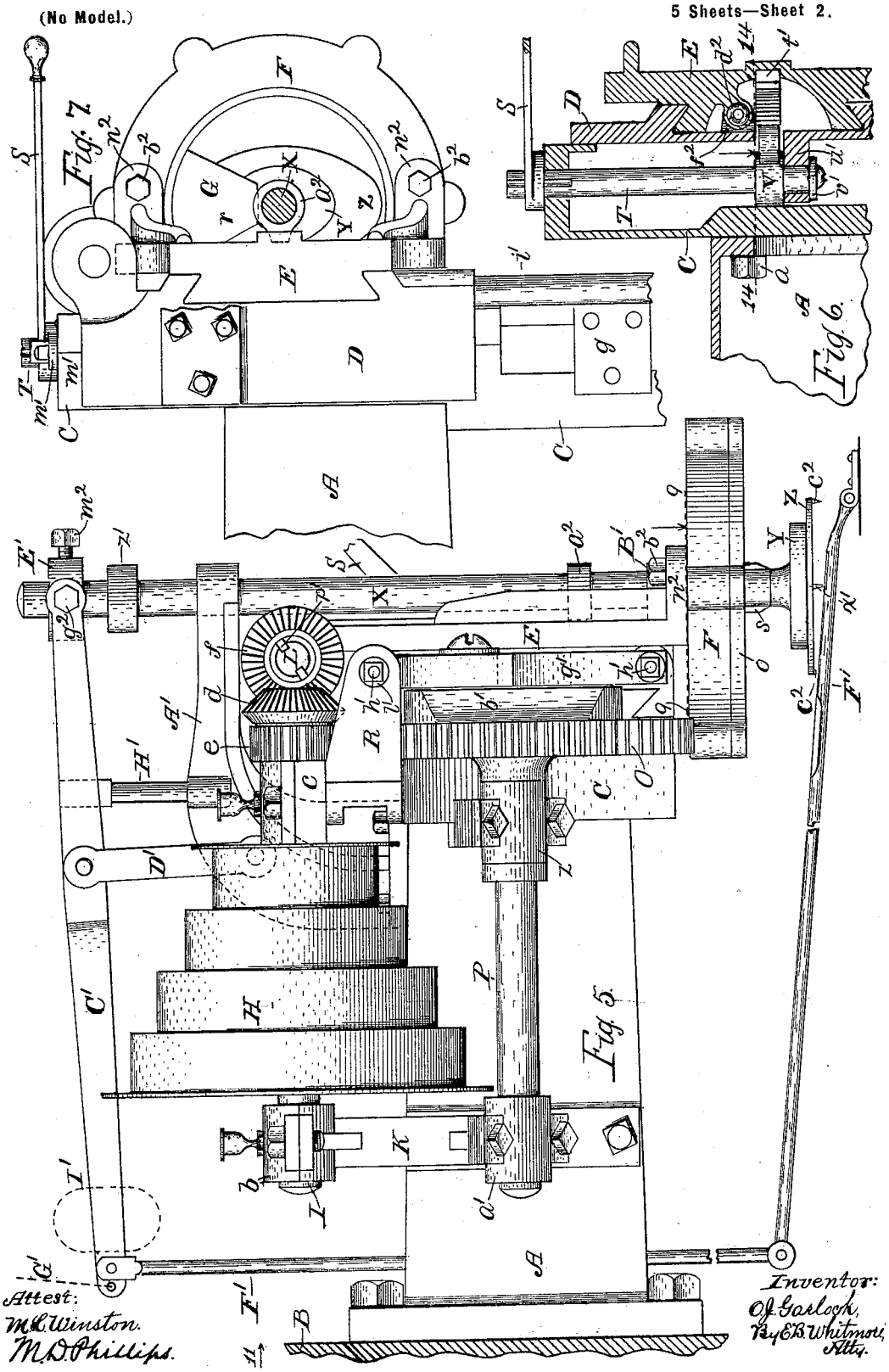
No. 648,943. Patented May 8, 1900.

O. J. GARLOCK.

MACHINE FOR FORMING GASKETS.

(Application filed Jan. 31, 1898.)

(No Model.) 5 Sheets—Sheet 2.



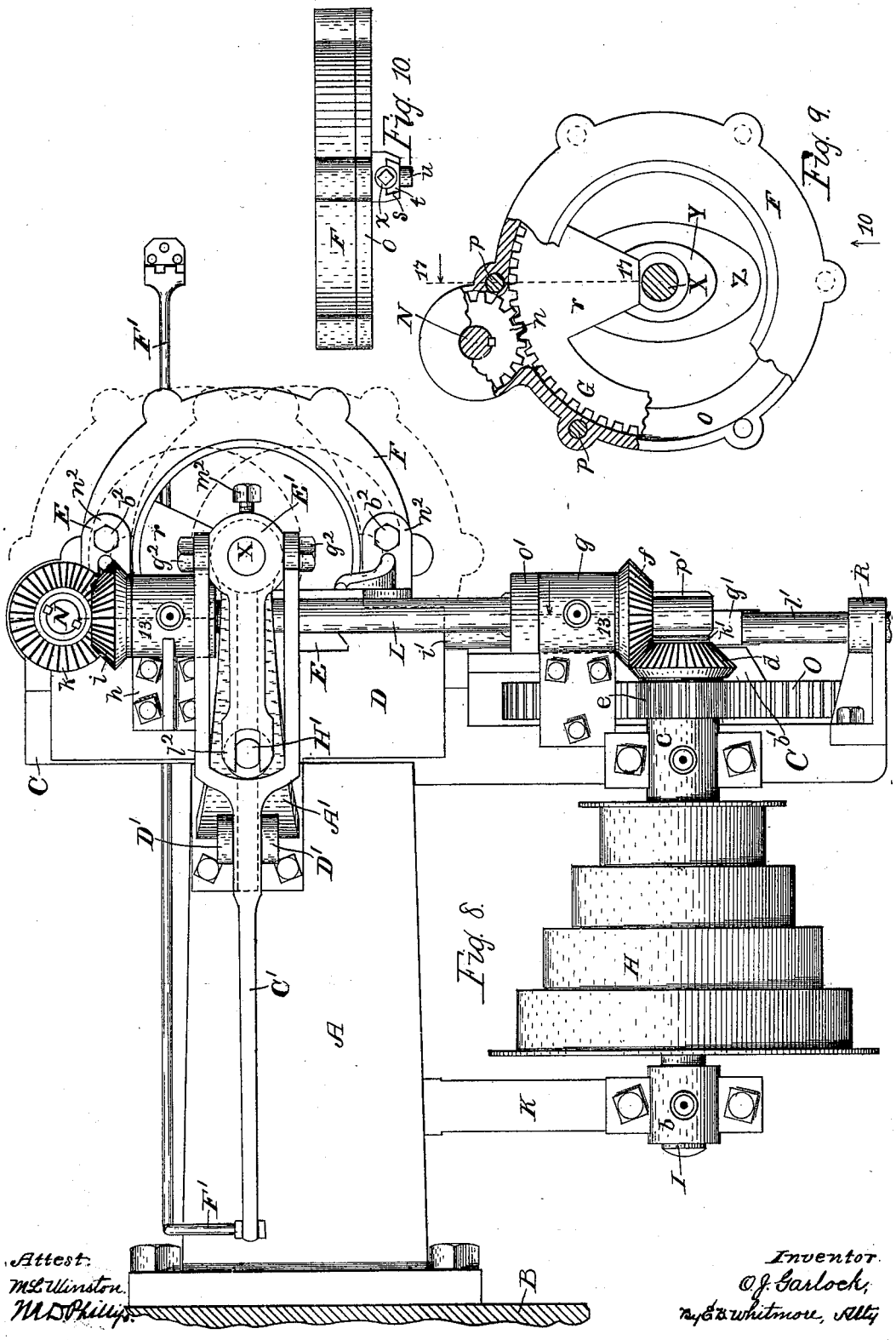
No. 648,943. Patented May 8, 1900.

O. J. GARLOCK.

MACHINE FOR FORMING GASKETS.

(Application filed Jan. 31, 1898.)

(No Model.) 5 Sheets—Sheet 3.



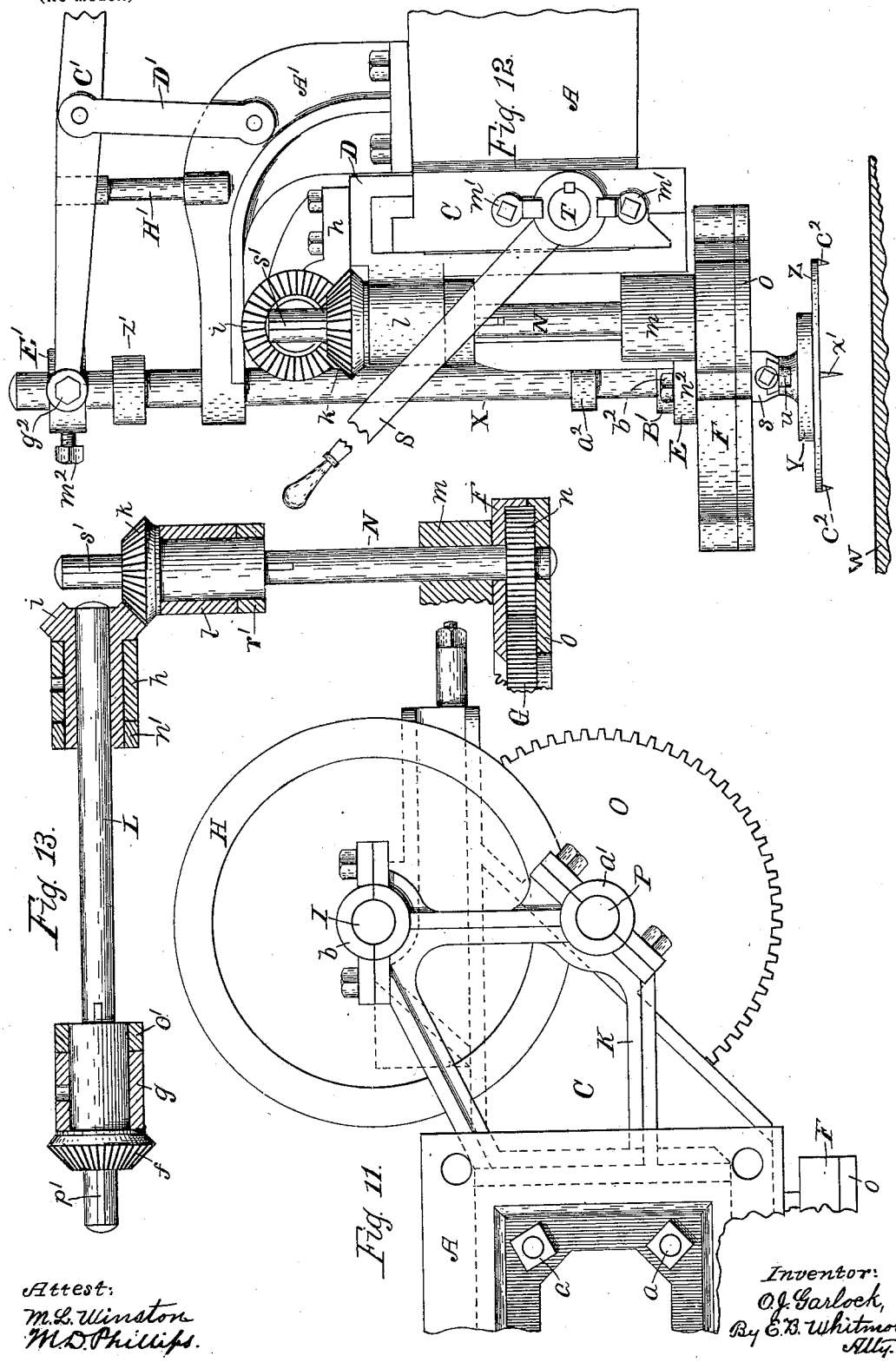
No. 648,943. Patented May 8, 1900.

O. J. GARLOCK.

MACHINE FOR FORMING GASKETS.

(Application filed Jan. 31, 1898.)

(No Model.) 5 Sheets—Sheet 4.



Attest:
M. L. Winston
M. D. Phillips.

Inventor:
O. J. Garlock,
By E. B. Whitmore,
Atty.

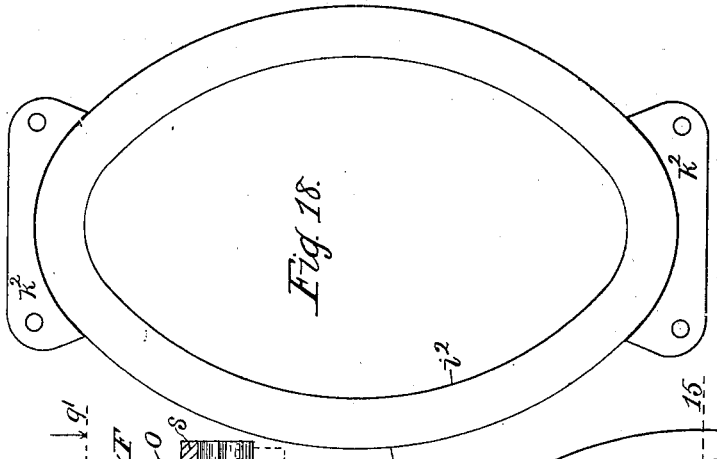
No. 648,943. Patented May 8, 1900.

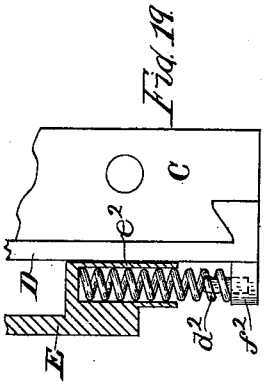
O. J. GARLOCK.

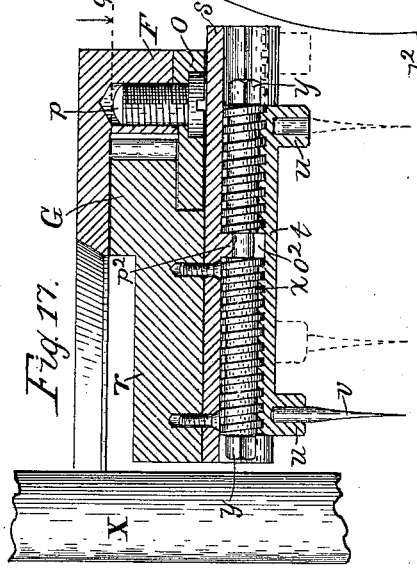
MACHINE FOR FORMING GASKETS.

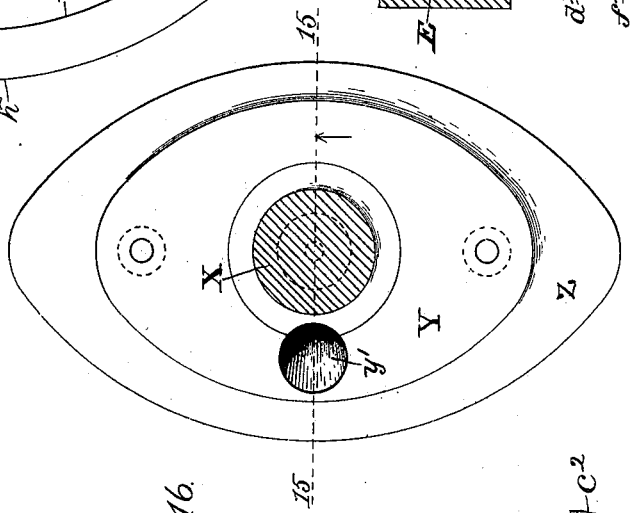
(Application filed Jan. 31, 1898.)

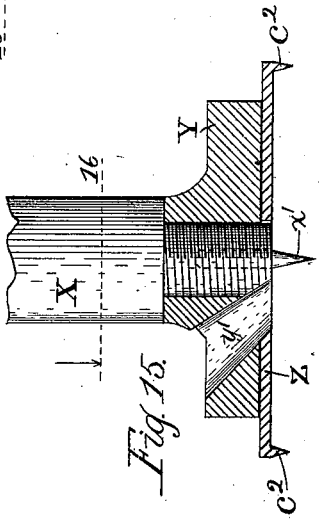
(No Model.) 5 Sheets—Sheet 5.

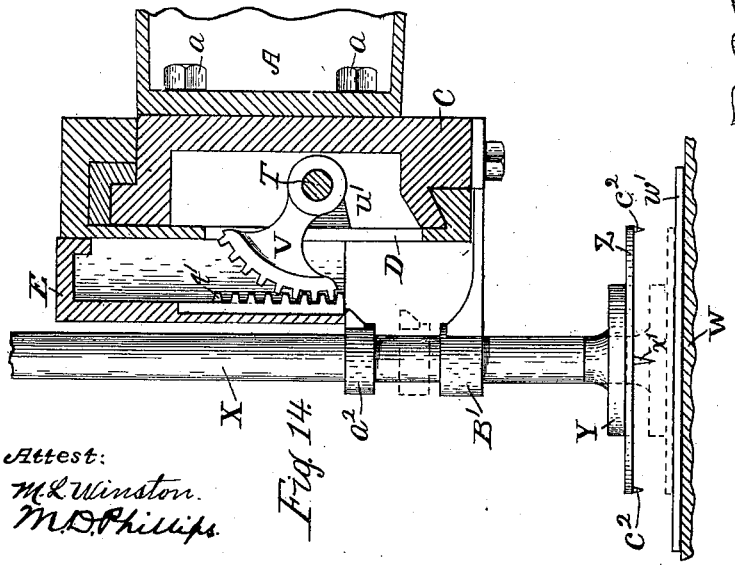












Attest:
M. L. Winston.
M. D. Phillips.

Inventor:
O. J. Garlock,
By E. B. Whitmore,
Atty.

UNITED STATES PATENT OFFICE.

OLIN J. GARLOCK, OF PALMYRA, NEW YORK, ASSIGNOR TO THE GARLOCK PACKING COMPANY, OF SAME PLACE.

MACHINE FOR FORMING GASKETS.

SPECIFICATION forming part of Letters Patent No. 648,943, dated May 8, 1900.

Application filed January 31, 1898. Serial No. 668,605. (No model.)

To all whom it may concern:

Be it known that I, OLIN J. GARLOCK, a citizen of the United States, residing at Palmyra, in the county of Wayne and State of New York, have invented a new and useful Machine for Forming Gaskets, which is fully set forth in the following specification and shown in the accompanying drawings.

My invention relates to improvements in machines for forming circular or elliptical packing-rings or gaskets from sheets of packing material, as fiber and india-rubber, the machine being such that the cutter may be made to move around either in a circular or an elliptical path of any predetermined dimensions within limits.

The main object of the invention is to produce a machine capable of forming rapidly and cheaply by power round or oval packing-rings or gaskets of any size and form required. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine with some minor parts sectioned and broken away. Fig. 2 is an end view of the slide-holder and associated parts. Fig. 3 is a vertical cross-section of parts of the machine on the dotted line 3 3 in Fig. 1. Fig. 4 is a view of the crank mechanism and some associated parts seen as indicated by arrow 4 in Fig. 1. Fig. 5 is a side elevation of the machine seen as indicated by arrow 5 in Fig. 1, parts being broken away. Fig. 6 is a horizontal section of parts of the machine on the dotted line 6 6 in Fig. 1. Fig. 7 is a plan of parts of the machine near the cutter-carrier, the drop-shaft being horizontally sectioned. Fig. 8 is a plan of the machine with some minor parts omitted, parts being shown in various positions by full and dotted lines. Fig. 9 is a plan of the holding-ring for the cutter-carrier and some associated parts, parts being broken away and other parts horizontally sectioned on the dotted line 9 9 in Fig. 5; and other parts on the dotted line 9′, Fig. 17. Fig. 10 is an edge view of the holding-ring for the cutter-carrier seen as indicated by arrow 10 in Fig. 9. Fig. 11 is a rear view of parts of the machine indicated by arrow 11 in Fig. 5. Fig. 12 is a side view of parts of the machine indicated by arrow 12 in Fig. 1. Fig. 13 is an elevation of the connecting-shafts for driving the cutter and some associated parts, parts being vertically sectioned on the dotted lines 13 13 in Fig. 8. Fig. 14 is a vertical section of parts of the machine on the dotted line 14 14 in Fig. 6, parts being shown in two positions by full and dotted lines. Fig. 15 is a view of the lower end of the drop-shaft, parts associated therewith being vertically sectioned on the dotted lines 15 in Figs. 1 and 16. Fig. 16 is a plan of the foot-piece and the plate, the drop-shaft being horizontally sectioned on the dotted line 16 in Fig. 15. Fig. 17 is a vertical section on the dotted line 17 17 in Figs. 2 and 9, parts being shown in two positions by full and dotted lines. Fig. 18 shows an oval or elliptical gasket as formed by the machine and adjusting-guides. Fig. 19 is an end elevation of a part of the frame and some associated parts seen as indicated by arrow 12 in Fig. 1, the gate being vertically sectioned to show the lifting-spring. Fig. 2 is drawn full size. Figs. 15 and 16 are drawn to a scale about two-thirds size, Fig. 17 to a scale about one-half size, and the remaining figures, except Fig. 18, to a scale of one-fourth size.

In the drawings, A, Figs. 5 and 8, is a rigid body or holder, usually of iron, which supports the other parts of the machine, it being secured to a vertical wall, post, or other convenient part B, from which it projects horizontally. This body is hollow and as a matter of convenience is formed square in cross-section, as shown. To the outer overhanging end of the body is secured a horizontal frame C, Figs. 1, 8, and 14, by some simple fasteners, as bolts *a*. Upon this frame is adapted to slide in horizontal directions a saddle D, which holds a gate or part E, adapted to slide in vertical directions along bearings upon the saddle. To the lower side of the gate—that is to say, to feet n^2 n^2 thereof—is secured a horizontal hollow ring or circular shell F, Figs. 1, 9, and 10, by means of simple fasteners b^2, serving to hold a cutter-carrying gear G.

H, Figs. 1, 5, 8, and 11, is a step-pulley of common construction for receiving an ordinary driving-belt for operating the machine.

This pulley is carried by a horizontal shaft I, having a bearing *b* at one end in a bracket K, secured to the body A, and a bearing *c* at its other end, held by the frame C. At its forward overhanging end the shaft I is provided with a miter-gear *d* and spur-pinion *e*, the miter-gear engaging a similar gear *f* on a horizontal shaft L, parallel with the frame C. This shaft L rests in bearings *g* and *h*, Figs. 1, 8, and 12, the former being secured to the frame C and the latter to the saddle D. At its opposite end this shaft is provided with a miter-gear *i*, engaging with a similar gear *k* on a vertical shaft N, resting in bearings *l* and *m*, the former being a projection of the saddle and the latter a projection of the gate E. At its lower end the shaft N is provided with a pinion *n*, Figs. 9 and 13, to engage the gear G. On account of this construction of the parts the turning of the step-pulley H will cause the gear G to revolve and carry the cutter *v*, Figs. 2 and 17, around.

The gear G is a toothed ring without hub or spokes and turns in a bearing in the ring or shell F, resting directly upon a circular plate *o*, Figs. 9 and 17, held to the ring F by simple fastening-screws *p*. The gear G is formed with an inwardly-projecting part *r*, Figs. 7, 9, and 17, which part extends slightly below the plate *o*, to the under surface of which part *r* is secured a slide-holder *s*, Figs. 1, 2, and 17. Within the slide-holder is a slide *t*, adapted to move or slide longitudinally in the slide-holder, the motions of said slide being radial. This slide *t*, which constitutes a holder for the cutter, is formed with downwardly-projecting sockets *u u*, one at either end, for receiving a knife or cutter *v*, Figs. 1, 2, and 17, said cutter being secured in either socket by a set-screw *w*. A radial traverse-screw *x* is held longitudinally within the slide-holder *s*, as shown in Fig. 17. This screw is cut away at o^2, and the slide-holder *s* is formed with an inwardly-projecting part p^2 to enter the space o^2, which serves to prevent any endwise motion of the screw in said slide-holder. The space o^2 is not made at the middle of the screw, but near to one end, as shown. The upper surface of the slide *t* is threaded to correspond with the threads of the screw, so as to be engaged by the latter. When the traverse-screw is turned, as with a wrench applied to the squared end *y*, the cutter will be moved toward or from the center of the ring, as the case may be. By these means the cutter may be adjusted or set to cut gaskets of various sizes when carried around by the gear G.

In forming the smaller-sized gaskets the cutter is inserted in the inner socket *u*—that is to say, the one appearing at the left in Fig. 17—and for larger gaskets the cutter is placed in the outer or right-hand socket. In case gaskets of the largest size are to be formed the traverse-screw *x* is reversed or turned end for end in the slide-holder *s*. This serves to throw the socket *u*, adjacent to the longer threaded part of the traverse-screw, still farther out from the center, (or the drop-shaft X,) as the part p^2 of the slide-holder occupies the recess o^2 in either position of the traverse-screw.

If the cutter in any case is merely carried around in a circle by the revolving gear G, the gaskets formed will be circular. To form oval or elliptical gaskets, other operations of the machine are necessary in addition to and simultaneously with those for forming circular gaskets—that is to say, the cutter-carrier must be given a rectilinear reciprocal motion while the cutter is carried around.

A spur-gear O, Figs. 1, 5, and 11, is provided upon a shaft P under and parallel with the shaft I. The shaft P rests in bearings *z* and *a'*, the former being on the frame C and the latter on the bracket K. This gear is engaged by the pinion *e* above mentioned, so as to revolve when the step-pulley is turned. The gear is formed upon its front face with slides *b'*, Figs. 1, 4, and 5, in which is placed a sliding head *c'*, controlled and adjusted by a screw *d'*, held in a rest *e'* projecting from the gear. The motions of the sliding head in the slides *b'* are in a line intersecting the axis of the shaft P. The sliding head is provided with a prismatic swivel-block *f'*, adapted to turn on a horizontal stud rigid in the head *c'*, this construction being common in different kinds of machinery. When the sliding head is drawn by the screw *d'* to a position in which the axis of the block *f'* is eccentric with that of the shaft P, the block will have a crank motion when the shaft is turned. Two vertical parallel bars *g' g'* are arranged one on either side of the block, being held at their upper and lower ends by bolts *h' h'*, threaded into the saddle D, as shown in Fig. 1. These bolts hold sleeves *i' i'* between the right-hand bar *g'* and the saddle and other sleeves *k' k'* between the bars *g' g'*, the former sleeves serving to keep the bars at a proper distance from the saddle and the latter sleeves constituting spacers for the bars themselves. The longer upper bolt *h'* also is provided with a sleeve *l'*, similar to the others, extending some distance to the left of the bars and through a rest R, rigid with the extreme end of the frame C, said sleeve being adapted to slide freely through said rest.

Now it will be understood that if the block *f'* have a crank motion the saddle with its dependent parts, including the cutter-carrying devices, will be caused to reciprocate while the cutter-carrying gear G is revolving, the saddle sliding upon its bearings on the frame C, and it will be also understood that this rectilinear reciprocal motion being given to the cutter while the latter is carried around by the gear G will cause the cutter to move in an elliptical line or track.

The gear *i*, as shown in Fig. 13, is formed

with a lengthened hub or sleeve, upon the end of which is secured a collar n', (see also Fig. 1,) the bearing h for the shaft being between the collar and the gear. The gear f on the same shaft L is likewise formed with an extended hub, upon the end of which is secured a collar o', the bearing g being between said collar o' and the associated gear. The gear f controls the shaft L as to its rotatory motions, said shaft being provided with splines p' to be engaged by said gear f. The shaft L, being adapted to slide longitudinally through the gear f, is in consequence controlled as to its endwise movements by the saddle D, holding rigidly the bearing h—that is to say, when the saddle is reciprocated, as already described, the shaft L will be carried backward and forward through the gear f. Similarly the gear k is formed with a lengthened hub provided at its lower end with a fixed collar r' below the bearing l. The shaft N, carrying said gear k, is adapted to slide vertically through said gear and is provided with splines s', so that while it slides freely through the gear the latter and the shaft must both turn together. The pinion n at the lower end of the shaft N is rigid with the shaft and being confined within the holding-ring F enables the latter to control the shaft as to its endwise motions and to cause it to slide through the gear k when the gate is raised or lowered.

The gate E is moved in vertical directions by means of a hand-lever S, Figs. 1, 6, 7, and 12, held upon a horizontal shaft T in the frame C, back of said gate. The gate is provided with an internal vertical toothed rack t', Figs. 6 and 14, and the shaft holds rigidly a toothed segment V to engage said rack, by means of which mechanism the attendant, by using the hand-lever, may lower or raise the gate at pleasure. At its outer end the shaft T rests in a bearing in the frame C, its inner end resting in a bearing u' of the saddle D. Some simple means, as a collar v', rigid with the shaft, is provided for enabling the saddle to control the shaft as to its longitudinal motions. The shaft is adapted to slide in endwise directions within its bearing in the frame C, it being carried backward and forward as the saddle is reciprocated on said frame. The lever S is splined onto the shaft and fits the latter freely, so the shaft may also slide through the lever during its endwise motions. Some simple means, as clips m', Figs. 1 and 12, rigid with the frame C and extending over the lever, as shown, serve to prevent the latter from being moved away from the frame by the action of the shaft.

The gate E is preferably arranged to have its weight supported by a spring d^2, Figs. 1, 6, and 19. This spring is inclosed in a vertical barrel e^2 in the rear of the gate and bears at its lower end upon a rest f^2, projecting from the saddle D.

The plan of the machine is such that the sheet of material w', from which the gaskets are cut, lies flat upon a horizontal table or bench W, Figs. 1 and 14, being held to place during the process of cutting mainly by means of a vertical drop-shaft X. At its lower end the drop-shaft is provided with a broad or expanded footpiece Y, Figs. 1, 15, and 16, to which is permanently secured a still broader thin metal plate Z to rest directly upon the sheet of packing material w'. This footpiece is preferably threaded onto the reduced end of the drop-shaft, as shown, so as to be removable therefrom. In practice a number of these footpieces with attached plates are provided of different sizes to be used according to the dimensions of the gaskets to be formed. The drop-shaft is further provided at its lower end with an axial point x' to pierce the sheet of rubber w' when let down upon the sheet. Each footpiece, with its accompanying plate, is formed with an inclined opening y', Figs. 1, 15, and 16, at one side of its center in such position that the attendant may see the point x' through it, the use of which will be explained farther on. The plate Z is also formed with downwardly-projecting barbs c^2 c^2 at its ends, which, piercing the sheet of packing material, prevent the latter from turning when pressed by the advancing cutter.

The drop-shaft is held near its upper end by a hanger A', Figs. 5 and 8, rigid with the body A, and near its lower end by a similar device B', Figs. 1 and 14, rigid with the frame C, the shaft being adapted to slide vertically through both hangers. An adjustable collar z' is provided on the shaft above the hanger A' to limit the extent of its downward motions by encountering the hanger A', and a similar collar or stop a^2 is provided to limit the upward motions of the shaft by encountering the gate E. This latter or upward stop for the drop-shaft is made practical from the fact that though the gate is moved in vertical directions, as above described, it is always up when the drop-shaft is lifted. The drop-shaft is always moved downward in advance of the gate and raised after the gate is up.

It is not material to the invention whether the drop-shaft is arranged to fall from gravity or to be brought down by an act of the attendant. Near the upper end of the shaft is connected a lever C', Figs. 1, 5, and 8, fulcrumed upon links D', secured pivotally to the holder or bracket A'. The lever is pivoted directly to a head E' by bolts g^2, adjustably secured to the drop-shaft, and at its opposite end may be provided with a counterweight I' (shown in dotted line) to normally hold the drop-shaft in its raised position, or the weight may be dispensed with and a simple device F', Figs. 5 and 8, be provided, by means of which the attendant may operate the drop-shaft with his foot. In case the weight be used for lifting the shaft the latter is moved down against the packing material by some simple means, as a cord or cable, (shown by dots G', Fig. 5,) attached to the end of the lever and passing over pulleys, with the free end in convenient

reach of the attendant. The matter of operating the drop-shaft is merely one of convenience and not of invention.

In forming the gaskets the sheet or slab of material out of which they are to be cut is placed under the cutter and "blanks" cut out corresponding with the outer line or edge h^2, Fig. 18, of the gasket required. Subsequently these blanks are again subjected to the action of the cutter shifted to a new position to remove the central portions thereof, following the inner line i^2. The gaskets, when completed, are circular or elliptical annular rings of uniform width between the inner and outer edges. The center pieces cut from large gaskets are commonly used, from which to form gaskets of smaller sizes. In placing the blanks to have the center parts cut out they are commonly placed within guides or holders k^2, secured to the surface of the table.

For accurately replacing the blanks under the cutter care is taken to so locate them on the table that the barbs e^2 of the plate Z and the point x' shall reënter the incisions originally made in them by said barbs and point. When thus placed, the major axes of the blanks and the center pieces removed will coincide, and the completed gaskets will have a uniform width of strip throughout. One blank being thus accurately placed upon the table, the guides k^2 are set to meet its ends and secured to place, by means of which other blanks of the same size may be readily placed to have their center parts removed. To thus accurately form elliptical gaskets, it is essential that the drop-shaft X shall not have any axial motion. To prevent this, the head E' is extended backward and formed into a fork l^2, Fig. 8, engaging a stud H', (see Fig. 5,) rigid in the holder A'. This prevents any twisting or turning of the drop-shaft in its bearings. However, it is sometimes convenient or necessary in doing the work to axially shift or adjust the drop-shaft. This is provided for by securing the head E to the shaft by some simple means, as a set-screw m^2, which may be loosened at any time for the purpose of turning the drop-shaft as may be required.

To gage the throw of the crank mechanism, one of the bars g', Fig. 1, is provided with graduation-marks r^2, by means of which the exact throw of the crank may be determined in any case. Also the slide-holder s is provided with a scale of equal parts s^2 for the purpose of determining the radial positions of the knife v. In forming elliptical gaskets the throw of the crank determines their major axes and the radial position of the cutter determines their minor axes.

Commonly in laying out the work the centers of the gaskets proposed to be formed are marked on the sheet of packing material by using templets or by other means in a manner to have the sheet cut to the best advantage and have as little waste as possible. After being thus marked the sheet is placed so the point x' of the drop-shaft will pierce it successively at the points marked. The projecting point x' is first to pierce the sheet, and by means of the view-opening y' the attendant is enabled to so place the sheet each time that it will be pierced by the point x' at the places marked.

What I claim as my invention is—

1. A machine for forming gaskets, having a reciprocatory rotary cutter-carrier and means to move said cutter-carrier toward or from the work, and for holding the material, and a cutter-holder controlled by said cutter-carrier, and a reversible screw for actuating the cutter-holder, substantially as described.

2. A machine for forming gaskets, having a frame, a saddle adapted to move horizontally upon said frame, a gate adapted to move in vertical directions upon the saddle, and a horizontal rotatory cutter-carrier supported by said gate, with driving mechanisms for said cutter-carrier and saddle, substantially as shown and described.

3. A machine for forming gaskets, comprising a frame, a reciprocatory saddle, a gate movable upon the saddle, a cutter-carrier carried by the gate, a shaft journaled upon the frame and saddle, a second shaft journaled upon the saddle and gate, and gearing operatively connecting said shafts and carrier, substantially as specified.

4. A machine for forming gaskets, having a reciprocal saddle, a movable gate on the saddle, and a cutter-carrier supported by the gate, in combination with a driving-shaft having an outer and an inner driving-gear, and driving parts connecting said outer gear with the cutter-carrier, and driving parts connecting the inner gear with the saddle, substantially as shown and described.

5. A machine for forming gaskets, having a vertically-movable shaft, a plate held by the shaft to press the gasket material, formed with spurs to pierce said material, and a center point or spur in the shaft to pierce said gasket material, and means for actuating said shaft, the latter being axially adjustable, and means being provided to hold it from turning in its bearings, substantially as shown and for the purpose set forth.

6. A machine for forming gaskets, having a vertical shaft, an expanded footpiece held removably upon the shaft, the latter being provided with a spur projecting below the footpiece, said footpiece being formed with an opening through which to observe said spur, substantially as specified.

7. A machine for forming gaskets comprising a shaft mounted to reciprocate at right angles to its length, a rotary cutter-carrier carried thereby, and means for simultaneously imparting a reciprocatory and rotary movement to the shaft, substantially as specified.

8. A machine for forming gaskets comprising a shaft reciprocatory in the direction of its length and also at right angles thereto, a

rotary cutter-carrier carried by said shaft, and means for simultaneously rotating the shaft and for reciprocating it laterally, substantially as specified.

9. A machine for forming gaskets comprising a rotary longitudinally-movable shaft mounted also for reciprocation at right angles to its length, a rotary cutter-carrier, means for rotating and for simultaneously reciprocating said shaft in a lateral direction, and means for actuating the shaft longitudinally, substantially as specified.

10. In a machine for forming gaskets, a reciprocatory rotary cutter-carrier, means for moving the same toward and from the work, and a shaft carrying said cutter-carrier and mounted for reciprocation transversely of the axis of the shaft of the carrier, substantially as specified.

11. The combination of a reciprocatory, rotary cutter-carrier, a shaft mounted for reciprocation transversely of the axis of the carrier, and a reciprocatory saddle supporting said carrier, substantially as specified.

12. The combination of a reciprocatory rotary cutter-carrier, a rotary and reciprocatory shaft movable at right angles to the shaft of the carrier, a reciprocatory saddle, and a gate movable on the saddle and supporting said cutter-carrier, as set forth.

13. The combination of a frame, a rotary and reciprocatory cutter-carrier, means for reciprocating said carrier during its rotation, a reciprocatory saddle, and a gate movable on the saddle and supporting the carrier, all substantially as shown and described.

In witness whereof I have hereunto set my hand, this 25th day of January, 1898, in the presence of two subscribing witnesses.

OLIN J. GARLOCK.

Witnesses:
ENOS B. WHITMORE,
M. L. WINSTON.