No. 637,875. Patented Nov. 28, 1899.

A. C. KRONQUEST.

CORRUGATING MACHINE.

(Application filed Sept. 16, 1899.)

(No Model.) 4 Sheets—Sheet 1.

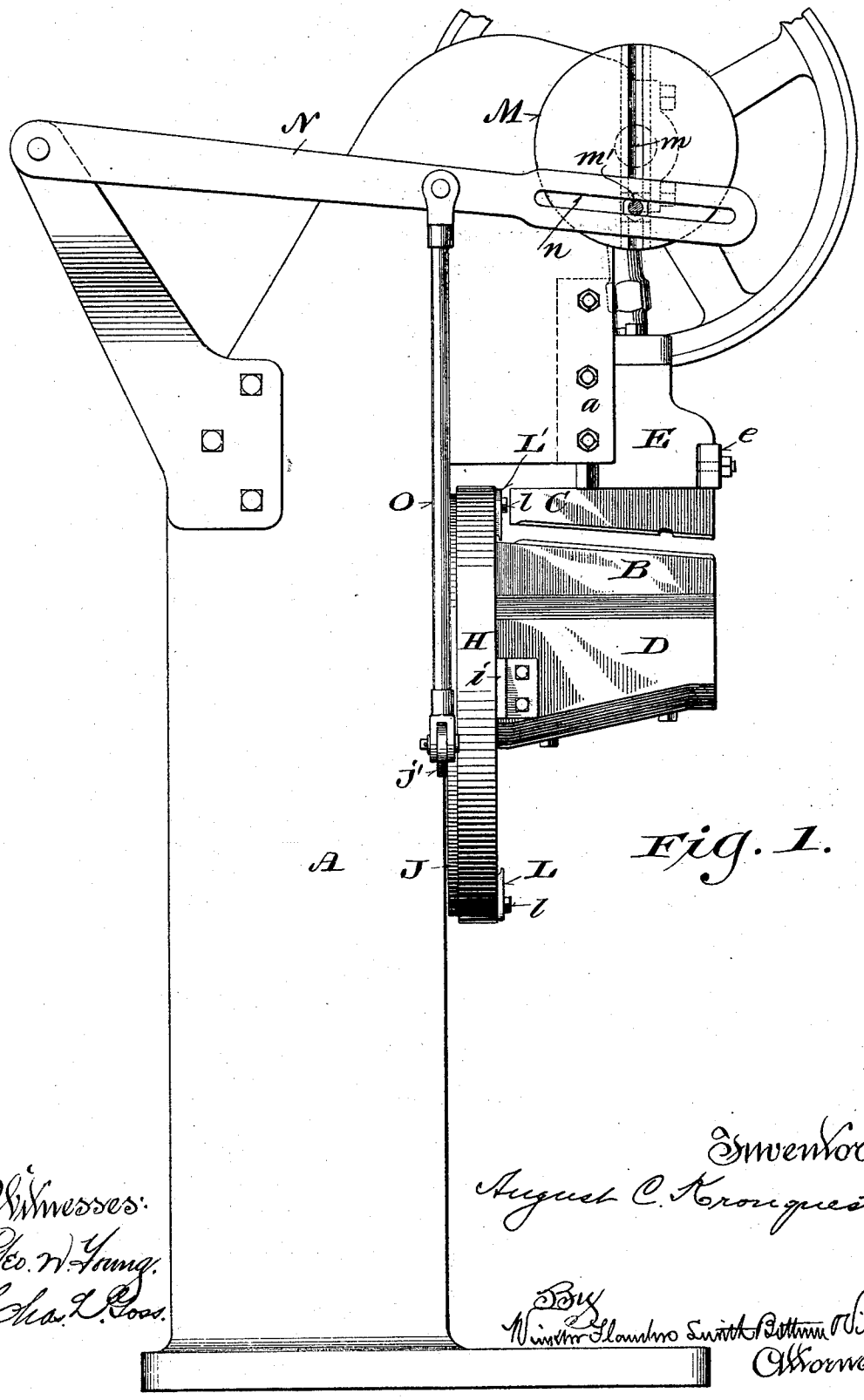


Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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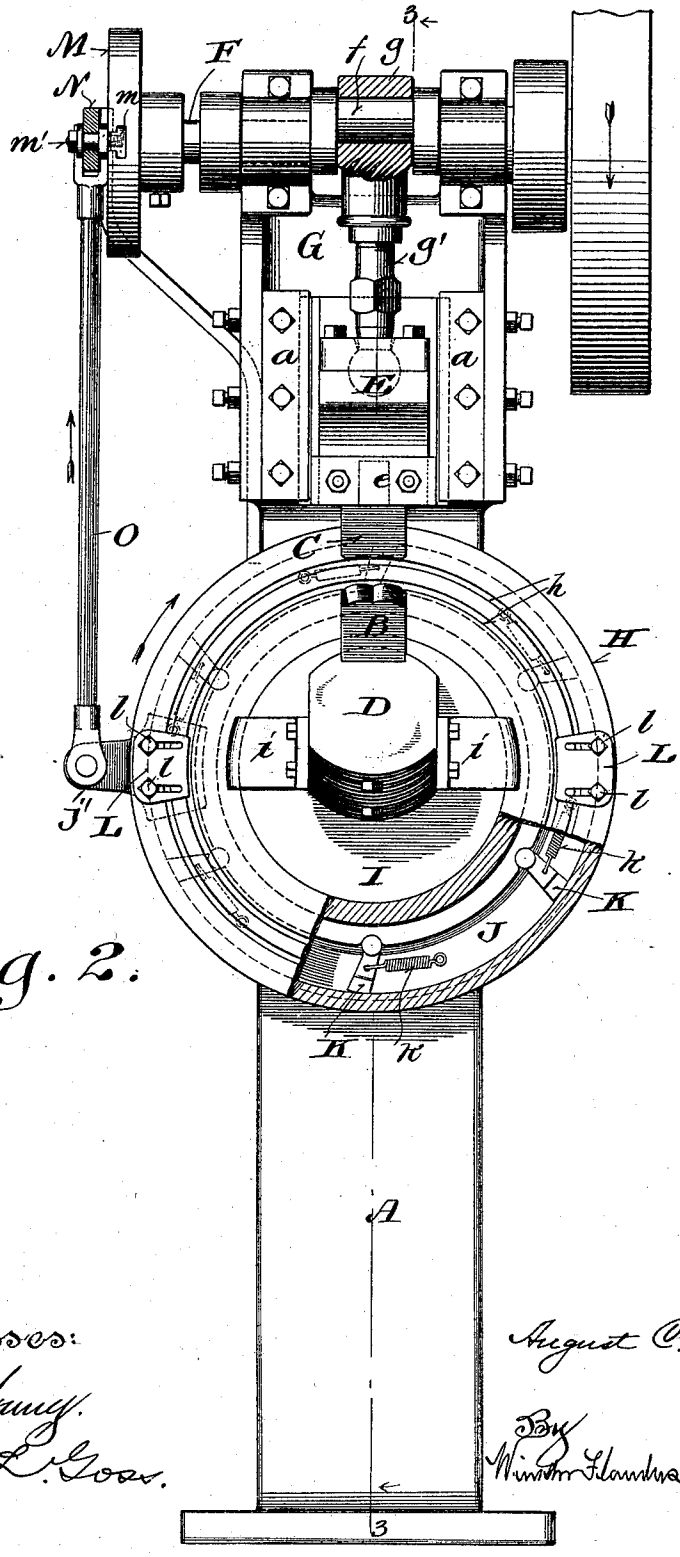


Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

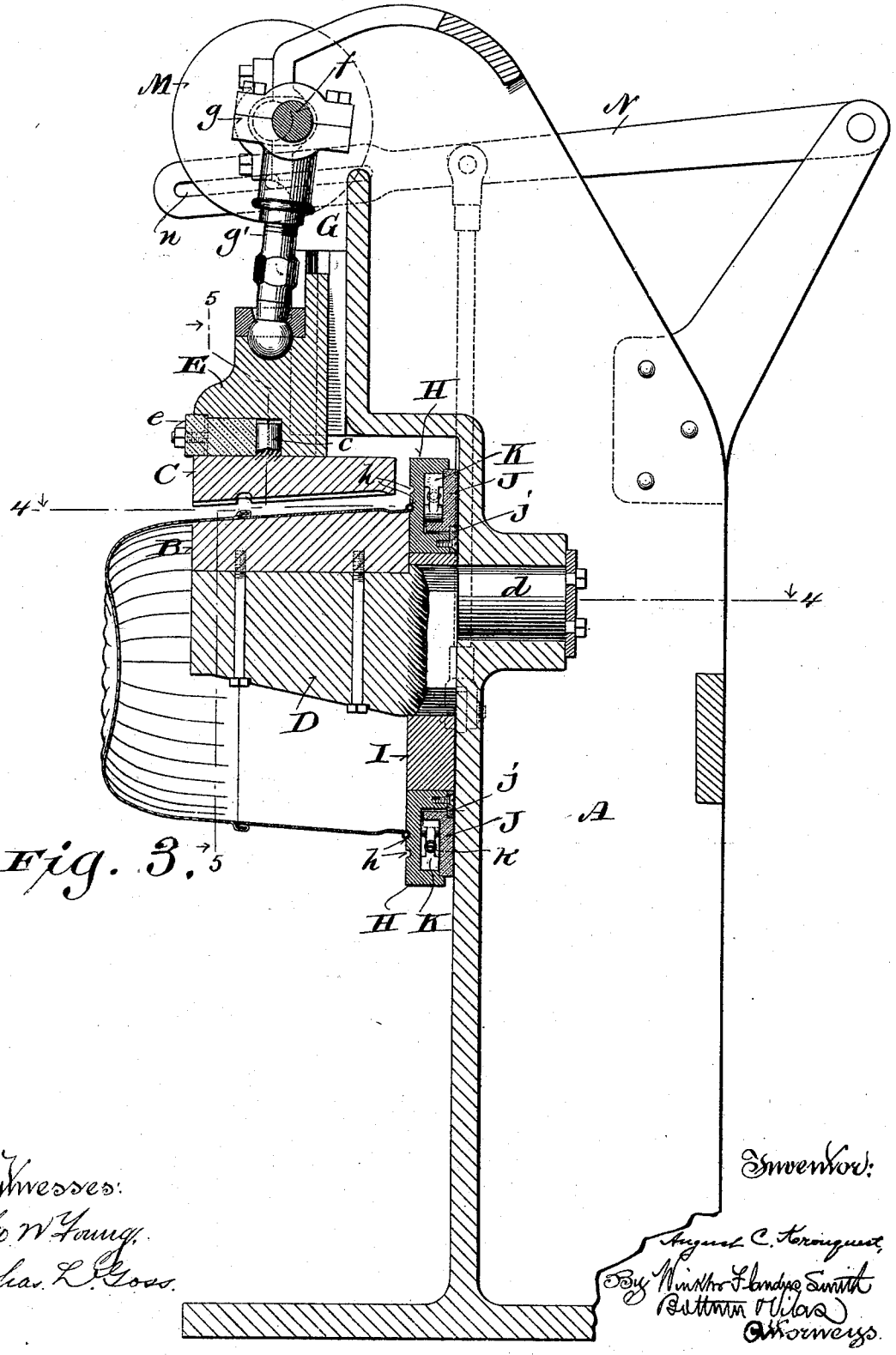


Fig. 3.

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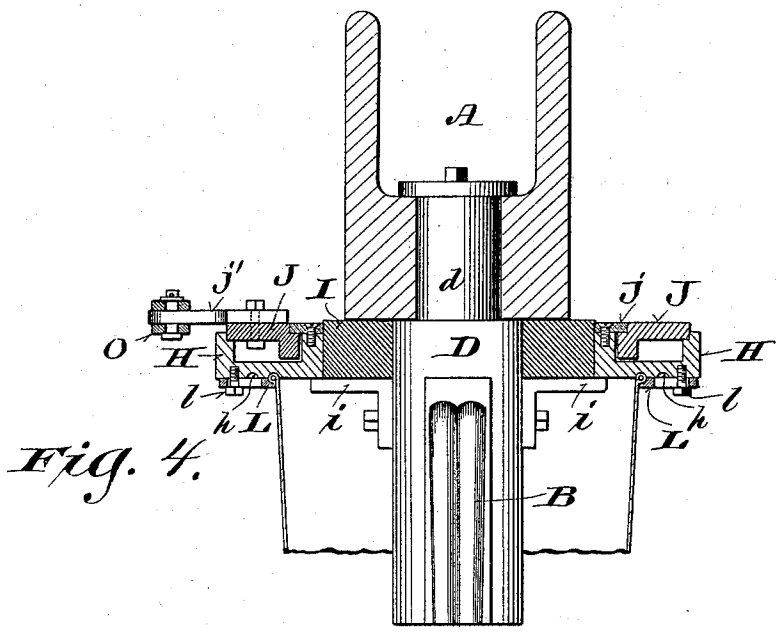
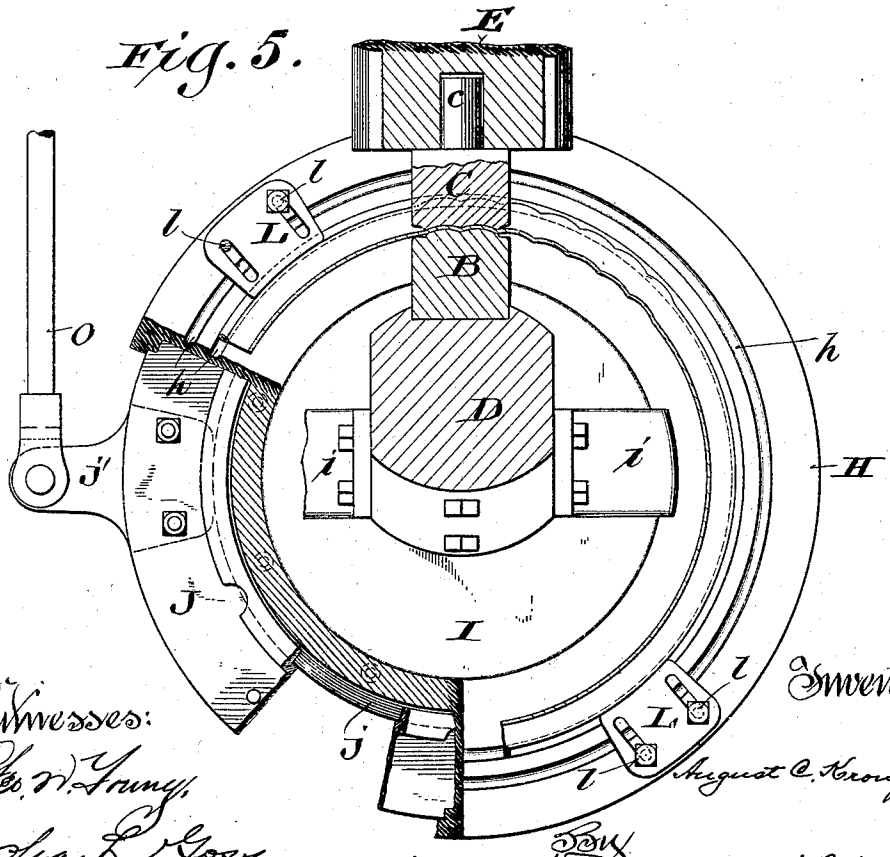


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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CORRUGATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 637,875, dated November 28, 1899.

Application filed September 16, 1899. Serial No. 730,693. (No model.)

To all whom it may concern:

Be it known that I, AUGUST C. KRONQUEST, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Corrugating-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The main object of my invention is to corrugate sheet-metal vessels, and particularly cylindrical, conical, or frustum-shaped vessels.

It consists in certain novel features of construction and in the arrangement and combinations of parts, as hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a side elevation of a corrugating-machine embodying my invention. Fig. 2 is a front elevation of the same, parts of the machine being broken away and shown in section. Fig. 3 is a vertical section of the machine on the line 3 3, Fig. 2. Fig. 4 is a horizontal section on the line 4 4, Fig. 3, showing the stationary die and its support in plan view; and Fig. 5 is an enlarged vertical section of the dies on the line 5 5, Fig. 3, and a front elevation of the rotary face-plate or holder, a part of which is broken away and shown in section to show its actuating connections.

A designates a suitable column or frame upon which the parts of the mechanism hereinafter described are mounted. It may be conveniently cast, as shown, in the form of a hollow column or standard, with a suitable base to rest upon a floor or other foundation and support it firmly in an upright position.

B and C are corrugating-dies constructed and arranged to form one or more corrugations of the desired shape at a time. The stationary die B is mounted upon the upper side of an arm or support D, formed at its rear end with a cylindrical shank *d*, by which it is adjustably secured in the column A. The movable die C is formed on the upper side with a cylindrical shank C, which is adjustably secured in a slide E by means of a clamping-block *e*, bolted to said slide. The slide E is movable vertically toward and from the stationary die B in ways *a a* on the column or frame.

The shanks *c* and *d* are arranged at right angles or transversely to each other, so that the two dies may be adjusted by turning said shanks in their bearings to work properly together. Dies of different forms and sizes may be used to produce corrugations of various shapes and to operate upon vessels of different sizes.

F is a driving-shaft supported horizontally in suitable bearings at the upper end of the frame or column, above the slide E. It is formed or provided with an eccentric or crank *f*, which is connected with said slide by an adjustable pitman G, comprising a box *g*, mounted upon said crank, and a rod *g'*, threaded at its upper end in a socket in said box and having a ball-and-socket connection at its lower end with said slide. By turning the rod *g'* the connection between the crank and slide is lengthened and shortened and the upper movable die is adjusted to work properly with the stationary die or to operate upon vessels of different sizes.

H is an annular rotary face-plate or holder which is adapted to turn upon the periphery of a stationary plate or ring I, mounted upon the support D between the column A and the stationary die B. This ring I may be formed with the arm or support D and is arranged eccentrically thereto, so that its periphery passes on the upper side below the working face of the stationary die B, as shown in Figs. 2 and 3. The face-plate or holder H is formed in its front side with one or more concentric annular grooves *h*, adapted to receive and hold the rims of the vessels to be corrugated. On the back side said holder is formed with an annular channel, in which a flanged ring J is fitted to turn. Between the rearwardly-projecting flange on the outer margin of the face-plate or holder and the forwardly-projecting flange on the inner edge of the ring J are interposed intermittent friction grips or dogs K. These grips are pivoted at their inner ends in the flange on ring J and are held in yielding engagement at their outer ends with the flange on the face-

plate or holder H by springs *k*. The ring J is held in place in the face-plate or holder H by a ring *j*, attached to said face-plate and overlapping said ring J. The face-plate or holder is held in place upon the bearing plate or ring I by keepers *i*, bolted to the sides of the die-support D and projecting outwardly therefrom over the inner edge of said face-plate, as shown in Figs. 2, 4, and 5.

L L are transversely-slotted segmental clamping-plates adjustably attached to the front side of the face-plate or holder H by bolts *l*, passing through the slots in said clamps and threaded in said face-plate. They are adapted to be set up against the outside of the vessel, next to its rim, which is inserted in one of the grooves *h* in the face-plate, and to securely hold the rim of said vessel in said groove while the vessel is being corrugated, as hereinafter explained.

M is a crank wheel or disk mounted upon one end of the shaft F. It is formed in its outer face with an undercut groove *m*, extending diametrically across it, and in said groove is adjustably secured the shank of a crank-pin *m'*.

N is a horizontally-disposed lever fulcrumed at its rear end to a bracket on the frame or column A and formed at its front end with a longitudinal slot *n*, which is engaged by said crank-pin. The lever N is connected by a rod O with an arm *j'*, projecting radially from one side of the ring J.

The machine herein shown and described is designed, primarily, to corrugate the sides or body or complete the corrugation of sheet-metal vessels the bottoms of which are formed and corrugated separately and afterward attached to the body or sides. The machine so constructed for this class of work operates as follows:

Suitable dies for forming corrugations of the desired shape on a vessel of a given size having been inserted in the machine and adjusted to work properly together and the feeding mechanism having been properly set by the adjustment of the crank-pin *m'* to turn the vessel by intervals exactly corresponding with the width of the corrugations produced by the dies, the vessel to be corrugated is inserted between the dies, the upper die being raised, and its rim is secured by the clamps L in the proper groove *h* on the face-plate or holder H. When the vessel to be operated upon has a bottom which has been previously corrugated or partially corrugated, it must be carefully adjusted and attached to the face-plate or holder in such position that the corrugations to be formed by the dies B and C will exactly correspond or register with the previously and partially formed corrugations in the bottom. When the vessel has been properly adjusted and secured to the face-plate, the machine is set in operation by starting the crank-shaft F. Each time the die C is forced down upon the side of the vessel between it and the stationary die B one or more corrugations, according to the width and construction of the dies, is formed, the face-plate and vessel attached thereto remaining quiescent during the operation. As the slide E ascends and the dies are separated the ring J is turned in the direction indicated by the arrow on Fig. 2 by means of its connections with the crank-wheel M. When said ring is turned in this direction, the grips or dogs K are forced outwardly into engagement with the flange on the face-plate or holder H, thereby causing said face-plate to turn with said ring an interval corresponding with the width of the corrugation or corrugations formed by the dies B and C. Another section of the vessel is thus presented in proper position for the operation of the corrugating-dies. As the slide E, with the die C, descends, the lever N also descends, turning the ring J backward in a direction opposite that indicated by the arrow on Fig. 2. When turned in this direction, the grips or dogs K yield at their outer ends against the tension of the spring *k* away from the flange on the face-plate or holder H, which remains quiescent until it is again turned forward in the manner above explained.

The operations above mentioned being repeated in the manner described, the corrugations are progressively formed, one or more at a time, the vessel being intermittently turned forward when the dies are separated until a complete revolution is made, whereupon the machine is stopped either manually or automatically by means not shown. The corrugated vessel is detached and removed and replaced by another.

In corrugating the sides of vessels the bottoms of which have been previously corrugated the dies B and C are made to overlap the previously-formed corrugations, so as to produce unbroken continuations thereof, the upper die being transversely recessed to receive the seam or joint between the bottom and body of the vessel, as shown in Fig. 3. The corrugations are thus made to pass through the joint between the parts of the vessel.

Various changes in minor details of construction and arrangement of parts may be made without affecting the principle or mode of operation of the machine and without departing from the spirit and intended scope of my invention.

I claim—

1. In a corrugating-machine the combination with dies and mechanism for opening and closing said dies, a rotary face-plate or holder provided with means for attaching a sheet-metal vessel thereto in position to pass on one side between said dies, and means for intermittently turning said face-plate or holder when the dies are separated, substantially as and for the purposes set forth.

2. In a corrugating-machine the combination with dies and mechanism for moving one of said dies toward and from the other, of a

rotary face-plate or holder provided with means for attaching a vessel thereto with its axis in line with the center of said holder, means for turning said holder intermittently as the dies are separated, and means for adjusting the actuating connection of said holder for advancing it longer or shorter intervals, substantially as and for the purposes set forth.

3. In a corrugating-machine the combination with dies and means for moving one of said dies toward and from the other, of a rotary face-plate or holder provided with means for attaching a vessel thereto with its axis in line with the center of said holder, and with one side passing between said dies, a ring or wheel concentric with said holder, one or more intermittent grips for locking said wheel with said holder and causing them to turn together in one direction, and mechanism arranged to impart an oscillatory movement to said ring or wheel and to advance said holder step by step as the dies are separated, substantially as and for the purposes set forth.

4. In a corrugating-machine the combination with dies and mechanism for moving one of said dies toward and from the other, of a rotary face-plate or holder formed with a groove to receive the rim of a vessel and to hold the vessel in position to pass on one side, as it is turned, between said dies, clamps for securing the rim of the vessel in said groove, and mechanism for intermittently turning said holder as the dies are separated, substantially as and for the purposes set forth.

5. In a corrugating-machine the combination with dies and mechanism for moving one of said dies alternately back and forth from and toward the other at regular intervals, of a rotary face-plate or holder provided with means for fastening a vessel thereto in position to pass on one side between said dies, an oscillatory gripping device adapted when turned in one direction to engage with and turn said holder, and when turned in the opposite direction to release said holder, a slotted lever connected with said oscillatory gripping device, and a crank having an adjustable crank-pin engaging the slot in said lever, substantially as and for the purposes set forth.

6. In a corrugating-machine, the combination of a fixed die, a slide movable toward and from said fixed die and carrying an opposing die, a rotary face-plate or holder provided with means for fastening a vessel thereto in position to pass on one side between said dies, and a driving-shaft having actuating connections with said slide and with said face-plate or holder, substantially as and for the purposes set forth.

7. In a corrugating-machine the combination with a suitable column or frame, of a die-support projecting from said frame, a die mounted on said support, a slide guided in ways on said frame and movable toward and from said die, a counter-die mounted upon said slide, an annular face-plate or holder mounted and revoluble upon said die-support, means for fastening the rim of a vessel to be corrugated to said face-plate or holder, and mechanism for reciprocating said slide and intermittently turning said face-plate or holder, substantially as and for the purposes set forth.

8. In a corrugating-machine the combination with a suitable column or frame, of a die-support having a cylindrical shank which is adjustably secured in said column, a die mounted upon said support, a slide movable in ways on said frame toward and from said die-support, a counter-die having a cylindrical shank adjustably secured in said slide transversely to the shank of said die-support, a rotary face-plate or holder mounted upon said die-support, and means for reciprocating said slide and for intermittently turning said face-plate or holder while said dies are separated, substantially as and for the purposes set forth.

9. In a corrugating-machine the combination with dies and means for moving one of said dies at regular intervals toward and from the other, of a rotary face-plate or holder having a circular flange on one side, a flanged ring revolubly and concentrically connected with said face-plate, spring-actuated friction-grips arranged between the flanges on said face-plate and ring and pivotally connected with one of said flanges and adapted to engage with the other when said ring is turned forward, and mechanism for imparting an oscillatory movement to said ring, substantially as and for the purposes set forth.

In witness whereof I hereto affix my signature in presence of two witnesses.

AUGUST C. KRONQUEST.

Witnesses:

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CHAS. A. PAESCHKE.