(No Model.)

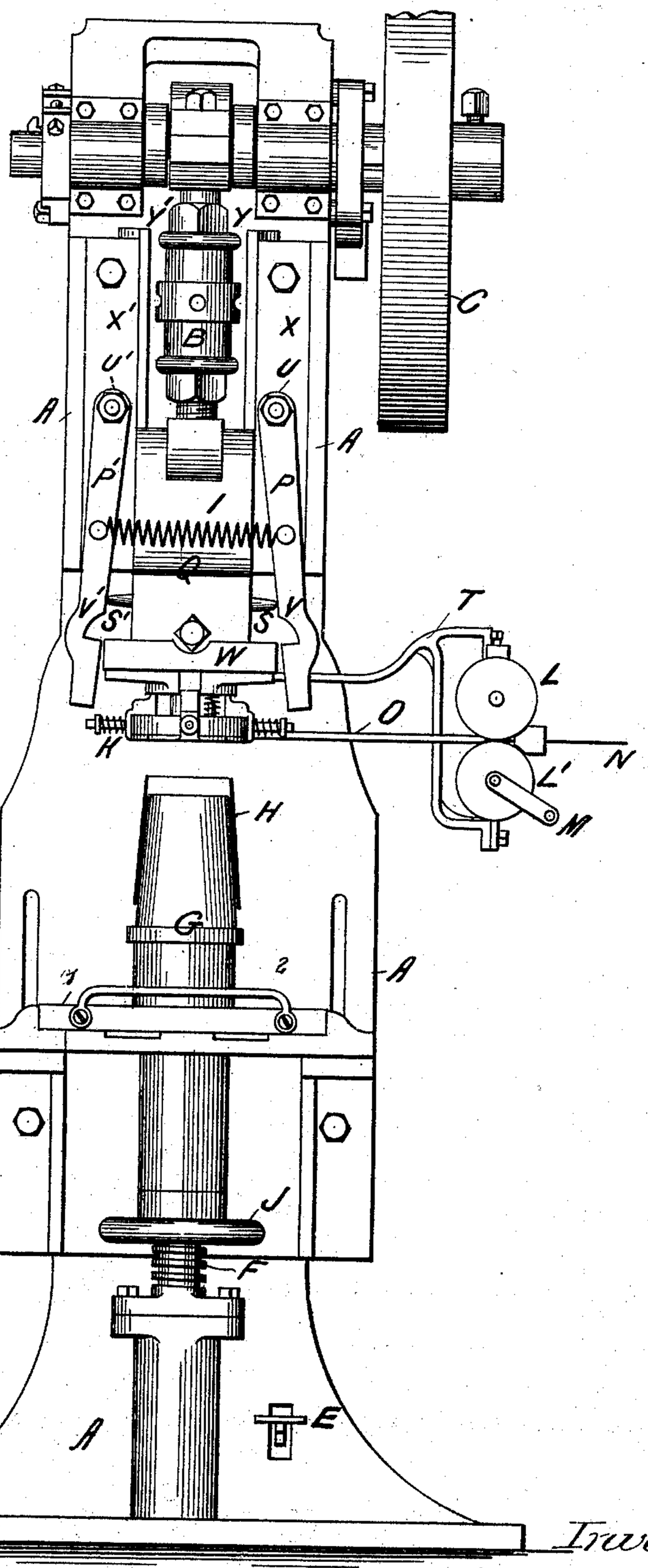
6 Sheets—Sheet 1.

H. S. REYNOLDS.

MACHINE FOR WIRING THE EDGES OF SHEET METAL VESSELS.

No. 505,675. Patented Sept. 26, 1893.

Fig. 1.



Attest:
Geo. H. Bolte.
Ewald Dick

Inventor:
Henry S. Reynolds
By Ennis & Webb
Attys.

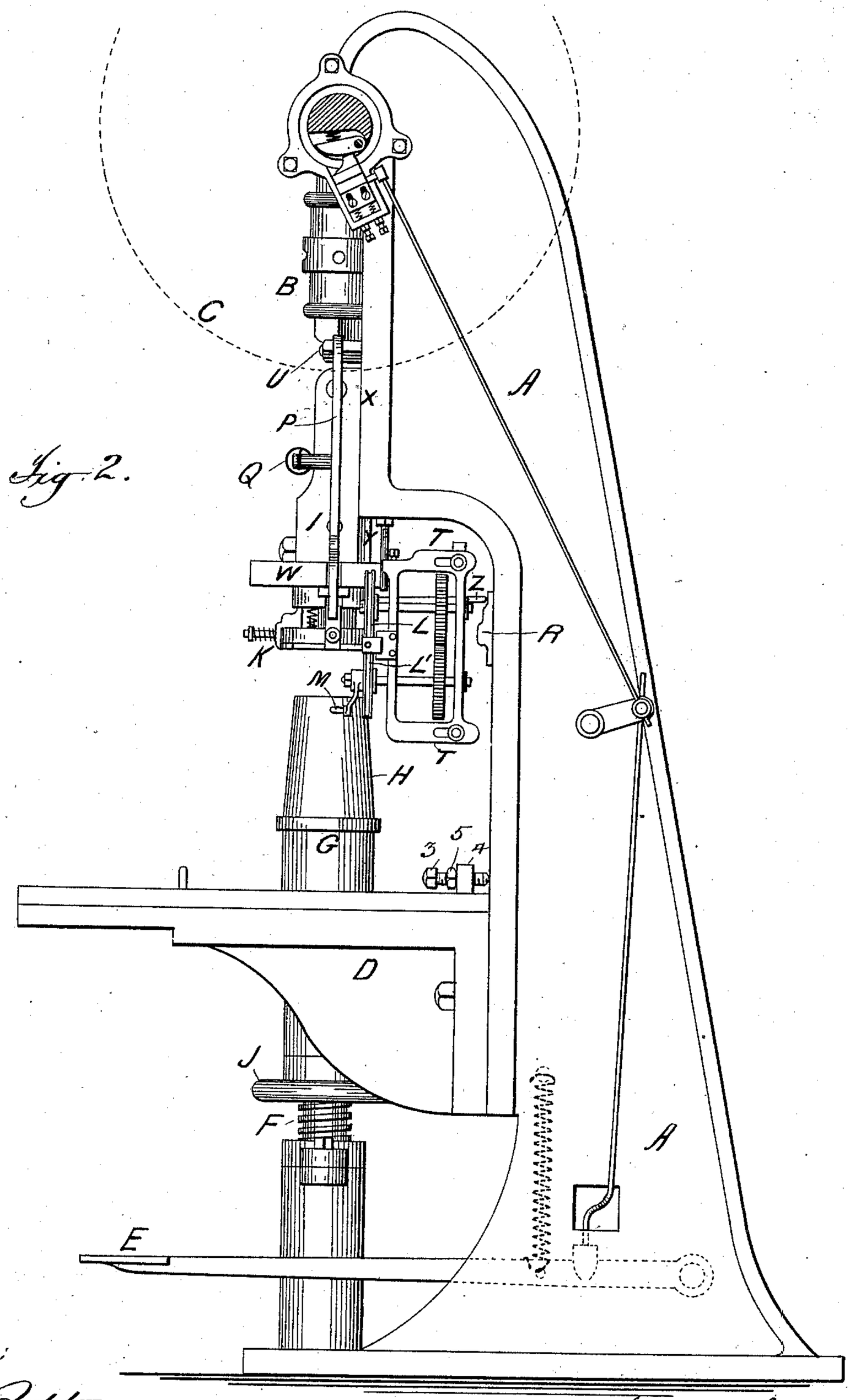
(No Model.) 6 Sheets—Sheet 2.

H. S. REYNOLDS.

MACHINE FOR WIRING THE EDGES OF SHEET METAL VESSELS.

No. 505,675. Patented Sept. 26, 1893.

Fig. 2.



Attest:
Geo. H. Bott.
Wm. Black

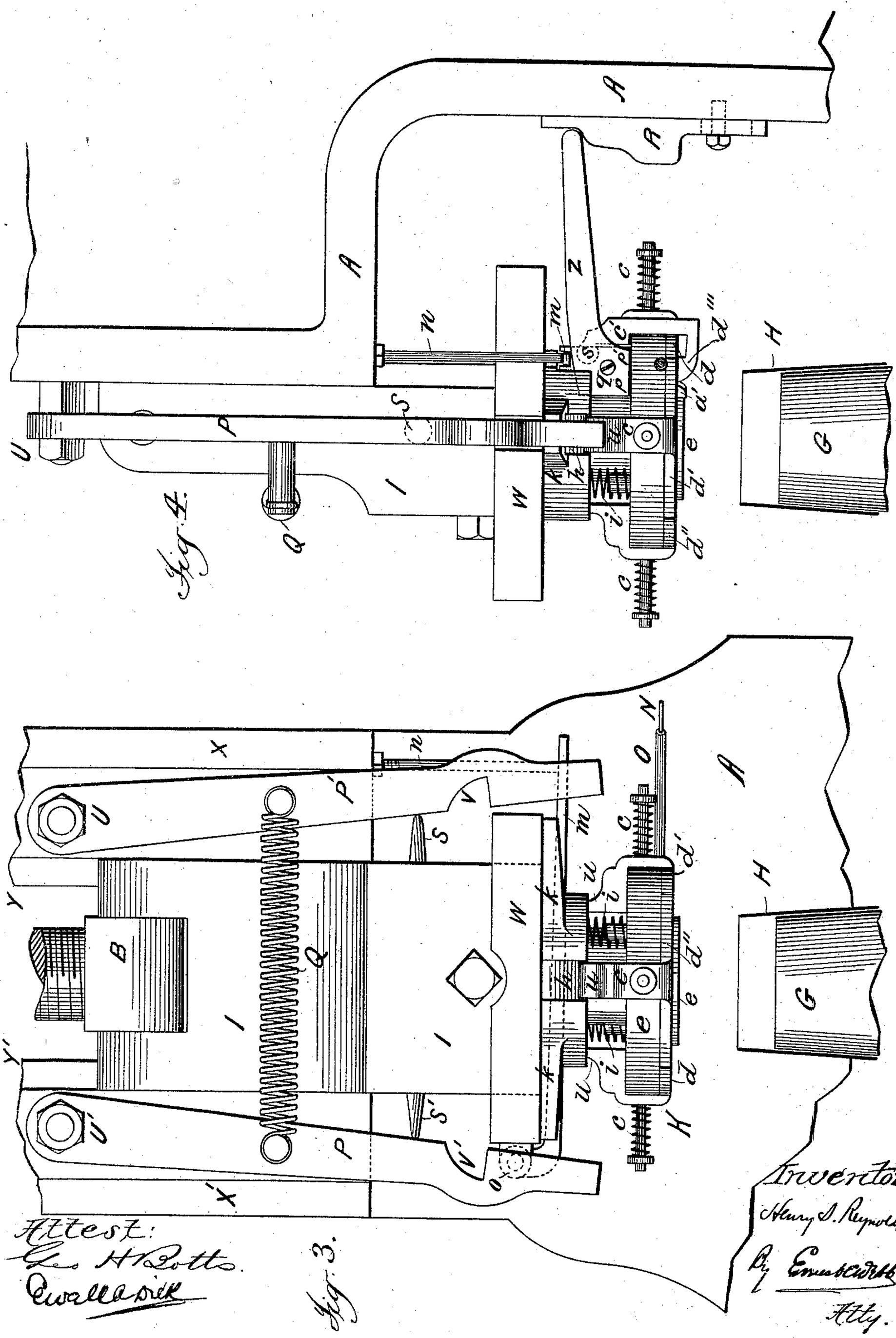
Inventor { Henry S. Reynolds
By Ennis Curtis
Atty.

(No Model.) 6 Sheets—Sheet 3.

H. S. REYNOLDS.

MACHINE FOR WIRING THE EDGES OF SHEET METAL VESSELS.

No. 505,675. Patented Sept. 26, 1893.



Witnesses:
Geo. H. Lotts.
Ewald Sieck

Inventor
Henry S. Reynolds
By Emerson & Webb
Atty.

(No Model.) 6 Sheets—Sheet 4.

H. S. REYNOLDS.

MACHINE FOR WIRING THE EDGES OF SHEET METAL VESSELS.

No. 505,675. Patented Sept. 26, 1893.

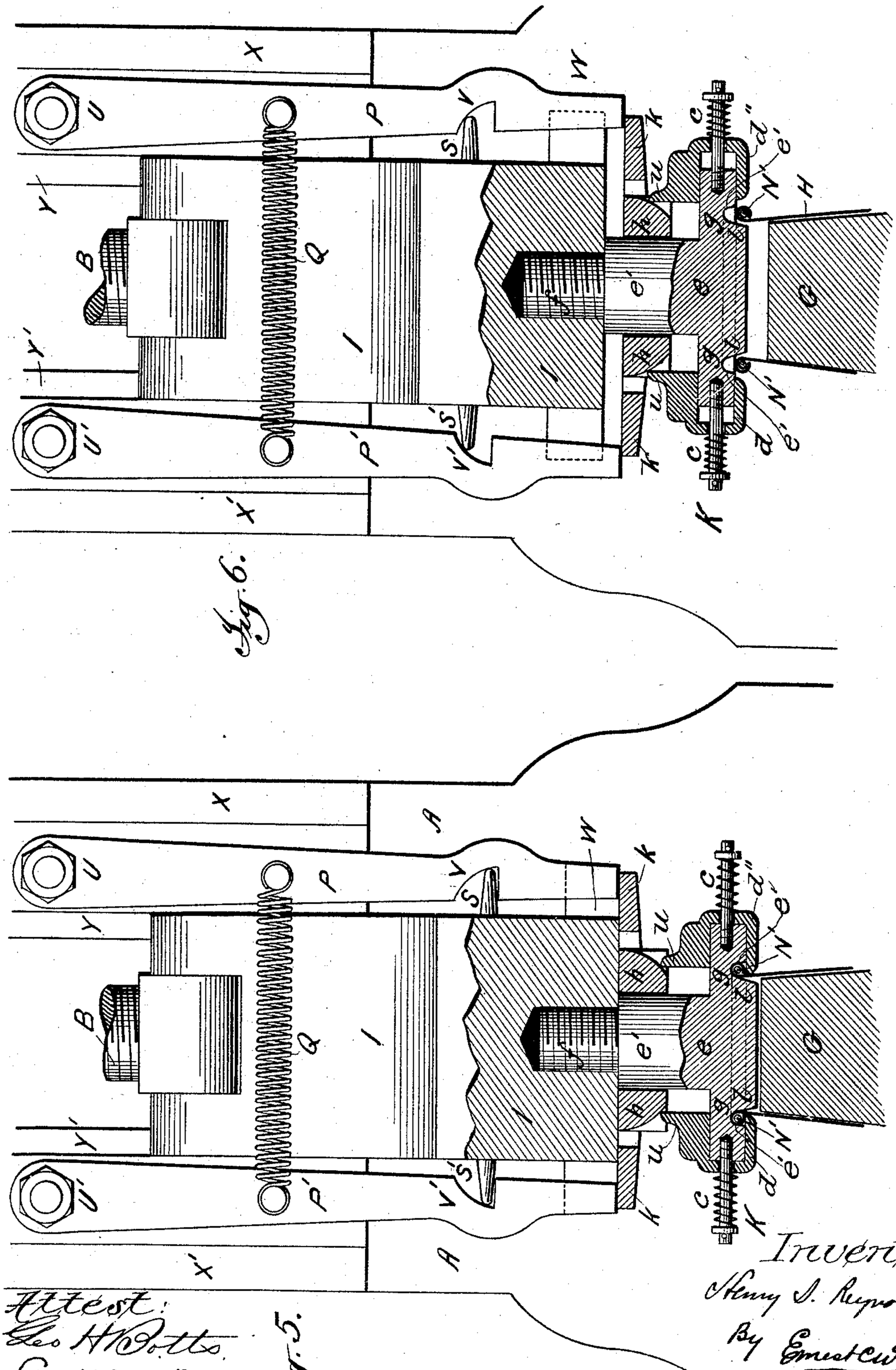


Fig. 6.

Fig. 5.

Attest:
Geo. H. Botts.
Ewall Cook

Inventor
Henry S. Reynolds
By Ernest Curtis
Atty

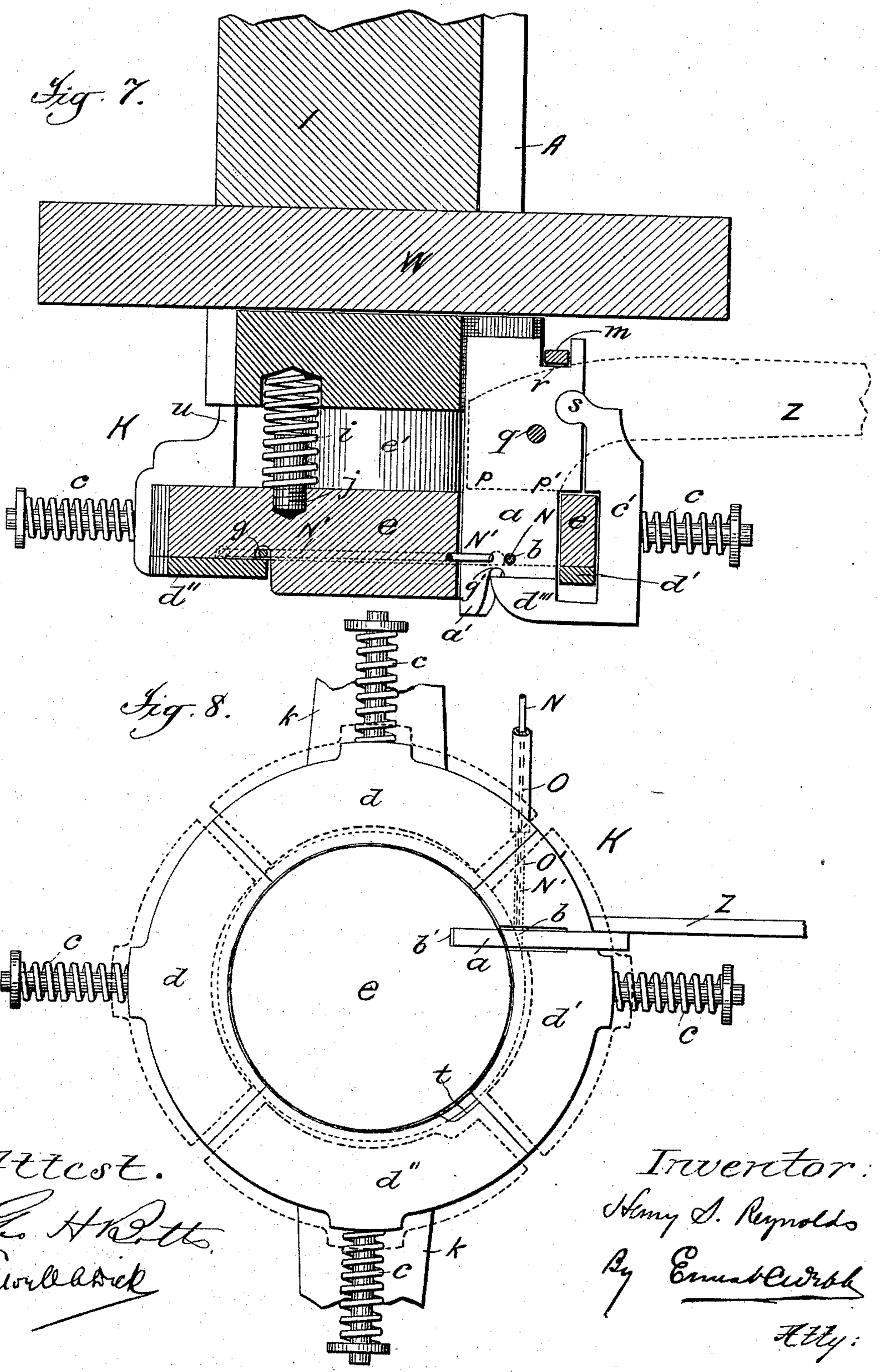
(No Model.) 6 Sheets—Sheet 5.

H. S. REYNOLDS.

MACHINE FOR WIRING THE EDGES OF SHEET METAL VESSELS.

No. 505,675. Patented Sept. 26, 1893.

Fig. 7.



Attest.
Geo. H. Roth.
Edw. Addick

Inventor:
Henry S. Reynolds
By Edmund Burke
Atty.

(No Model.) 6 Sheets—Sheet 6.

H. S. REYNOLDS.

MACHINE FOR WIRING THE EDGES OF SHEET METAL VESSELS.

No. 505,675. Patented Sept. 26, 1893.

Fig. 10.

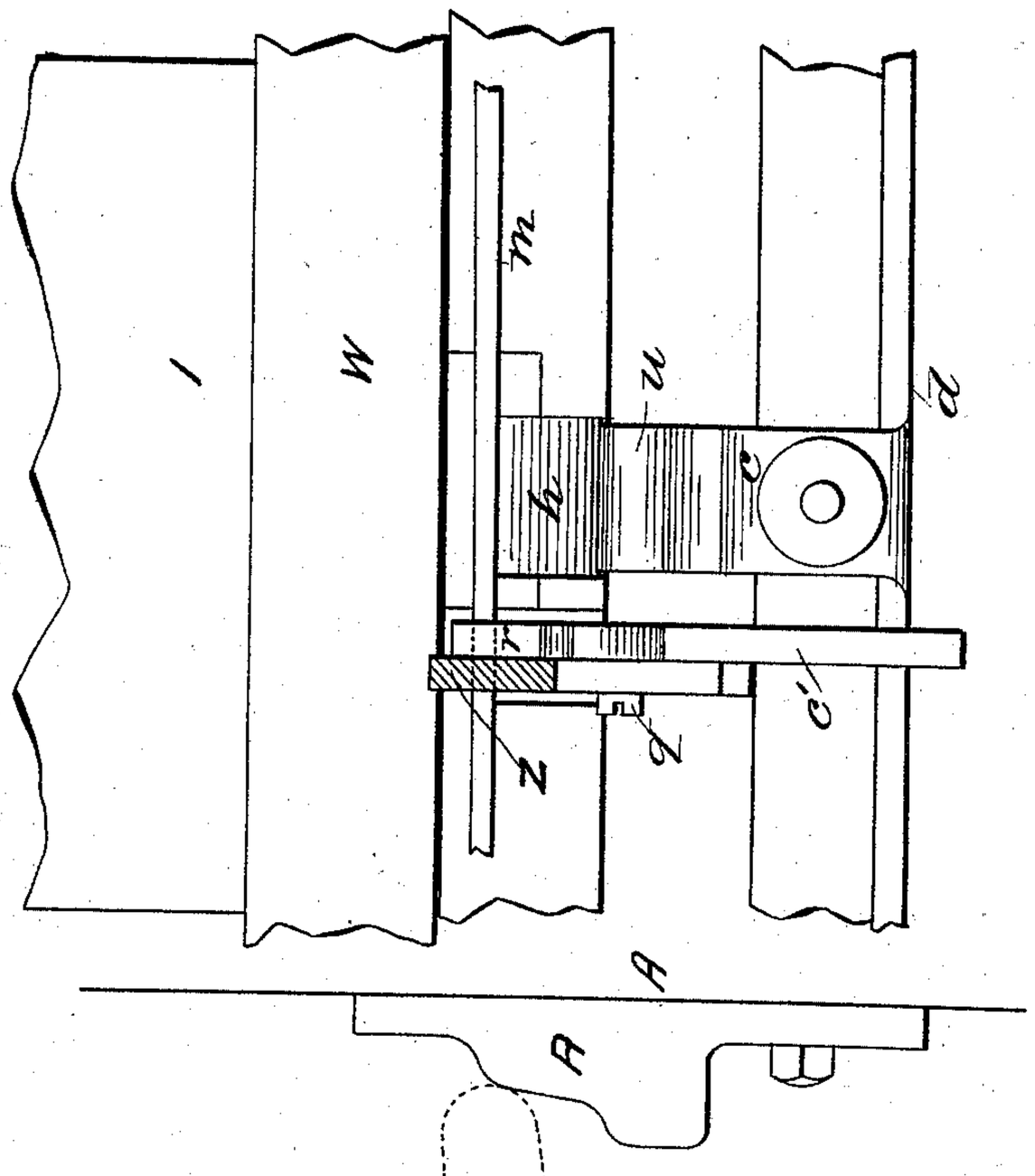
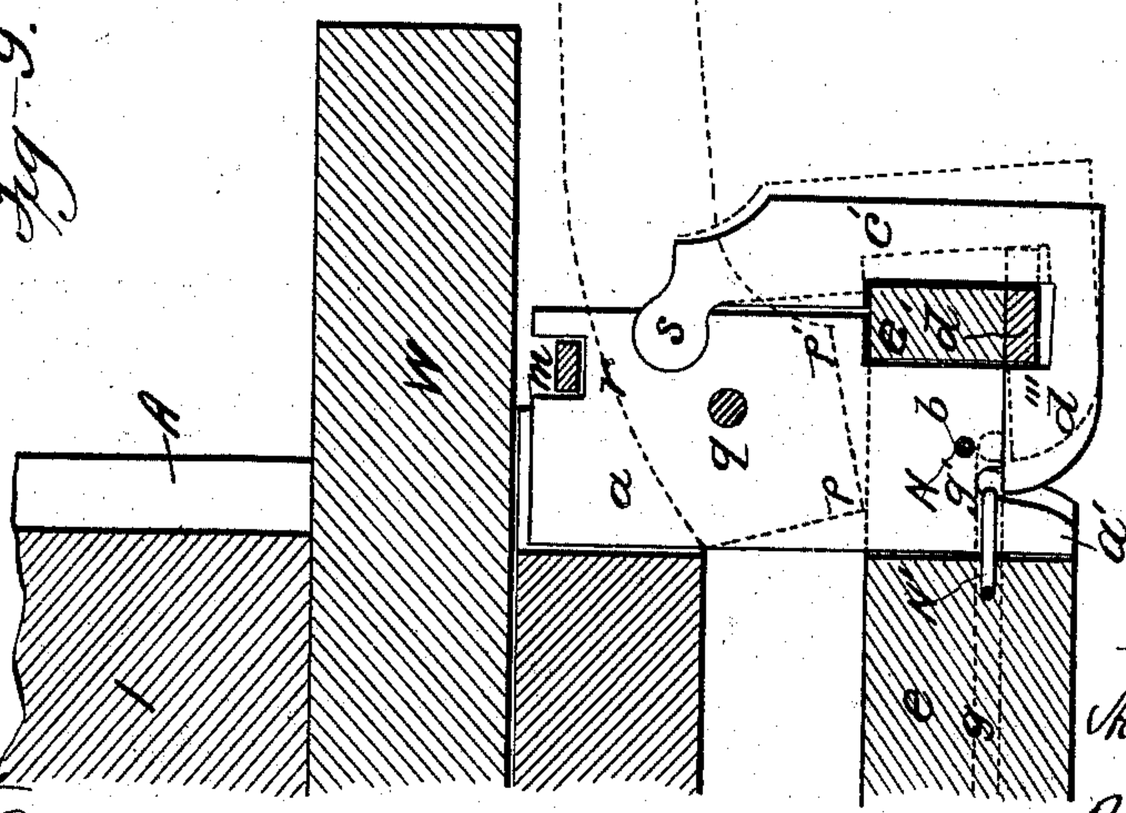


Fig. 9.



Witnesses:
Geo. H. Bott
Cwalladick

Inventor
Henry S. Reynolds
By Ernest Cobb
Atty

UNITED STATES PATENT OFFICE.

HENRY S. REYNOLDS, OF BROOKLYN, NEW YORK.

MACHINE FOR WIRING THE EDGES OF SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 505,675, dated September 26, 1893.

Application filed October 14, 1891. Serial No. 408,714. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. REYNOLDS, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Wiring the Edges of Sheet-Metal Vessels, of which the following is a specification.

This invention relates to the wiring of the edges of sheet metal vessels, such as coffee pots, cans, &c., so that the metal will be rolled over the wire to form a smooth edge or bead.

It is the object of this invention to produce a machine by means of which the wiring operation can be performed automatically and at the same time much more rapidly and cheaply than heretofore, and with substantial uniformity.

The construction and operation of my machine are fully disclosed in the following specification and accompanying drawings, the letters and numerals of reference in which indicate the same parts in all the figures.

Referring to the drawings, Figure 1 is a front elevation of the complete machine, and Fig. 2, a side elevation of the same. Fig. 3 is a front elevation of the shaping and forming head, and Fig. 4 a side elevation of the same. Fig. 5 is a front sectional view of the shaping and forming head when in the position of forming the bead on the vessel, and Fig. 6, a similar view of the shaping and forming head just after the bead has been formed and the vessel released. Fig. 7 is a sectional side view of the shaping and forming head, showing the details of the wire cutting device in position to allow the wire to pass through the cutter. Fig. 8 is a plan of the under side of the shaping and forming head. Fig. 9 is a side sectional view of the shaping and forming head showing the position of the wire cutting device just after cutting the wire; and Fig. 10 is a rear elevation of the cutting device.

The operating parts of the machine consist in general terms of a form upon which the vessel to be wired can be placed and firmly held, capable of movement horizontally and vertically so as to bring it in position under a shaping head. This head is mounted in the machine so as to reciprocate vertically, when the machine is in operation, to bring it down upon and withdraw it from the vessel to be wired. The shaper is provided with an annular horizontal groove, the lower part of which can be nearly closed by horizontally movable jaws. Wire is fed into this groove and automatically cut off when a ring has been formed, and the edge of the sheet metal vessel is then forced over this wire, making a smooth-turned bead upon the vessel. After the bead is formed, the upward movement of the shaping head releases the vessel, which is removed from the form by hand, and another placed in position.

The cycle of operation in forming the complete bead consists of six steps, as follows: first, placing the vessel to be wired upon the form of the machine; second, feeding the necessary amount of wire into the groove in the shaping head; third, cutting the wire off; fourth, forcing the metal of the vessel around the wire to form the bead; fifth, releasing the vessel from the shaping head, and, sixth, removing the wired vessel from the holding form of the machine.

Referring to the drawings, the main body A of the machine may be of any suitable make of power press, the head I being caused to vertically reciprocate upon the guides Y, Y′, in the usual way, by means of the connecting rod B attached to the shaft of the pulley C. The bed D is adjustable vertically by means of the hand-wheel J, running on the screw F, and the face 1, of said bed is movable horizontally by the handle 2, (Fig. 1,) its inward movement being limited and adjusted by set-screw 3, (Fig. 2) working through the lug 4 on said face, and regulated by lock or jam-nut 5.

Attached to the reciprocating head I is a plate W, to which there is attached the forming and shaping head K. The construction of the part is shown in detail in Figs. 5 and 6. Referring to these figures, *e* is a horizontal plate attached to the reciprocating head I by the screw shank *f*. This plate is provided with radially movable jaws, *d*, *d*, *d′*, *d″*, shown in plan on the under side in Fig. 8. These jaws have extensions *u* above the plate *e* to meet the taper projections *h*, *h* on the plate *k* by the approach of which toward each other, the jaws *d*, *d*, *d′*, *d″* are thrown radially outward when the work is to be released from

the machine. The jaws d, d, d', d'' are normally kept in position against the edge of the plate e by the spring c. The under side of the plate e is provided with an annular channel g, g, semi-circular in cross-section, which channel constitutes the space into which the wire is fed and the sheet metal of the vessel forced around it. The center of the plate e projects beyond the surface of the plate and is made slightly conical so as to form a plunger which enters the top of the vessel and crowds the metal into the channel g, g, and around the wire. The inner wall l, l of the channel g, g is, therefore, tapered, while the outer wall l', l' is vertical. While the metal is being forced around the wire N', N', the jaws d, d, d', d'' are in the position shown in Fig. 5, leaving only a narrow slot between their inner edges and the taper center of the plate e, just sufficient to allow the sheet metal of the vessel to enter. When the operation is completed, the jaws d, d, d', d'' are thrown outward by the upward movement of the extensions u, u, against the taper projections h, h, on the plate K, as shown in Fig. 6, and described in detail below. The wire N is fed into the channel g, g, by means of the friction wheels L, L', through the guide tube O. (Fig. 1.) These wheels are mounted upon a frame T secured to the plate W attached to the reciprocating head I. The feeding of the wire is accomplished by rotating the wheels by means of the crank M. The wire is forced forward until it has traveled the length of the channel g, g, in the shaping head e, when it is automatically cut off. The method of doing this is shown in Figs. 7, 8 and 9. The plate e has a slot cut through it at one side, extending from near the outer edge across the annular groove g, g. In this slot fits a plate a arranged to play in it vertically. The lower line of this movable plate is of the same shape as the section of the plate e, it having a groove g' corresponding to the groove g, g, and an extension a' corresponding to the projecting center of e. The plate a has pivoted to it at S a swinging jaw c', d''', which closes the bottom of the groove g' in the same manner that the bottom of the groove g, g, in the plate e is closed by the radially movable jaw d, d, d', d''. When the plate a is in its highest position, as shown in Fig. 9, the groove g' coincides with the groove g, g, in the plate e, and there is then a continuous annular channel, and the parts are in the position for forming the bead upon the vessel. While the wire is being fed and prior to its being cut off, the parts are in the position shown in Fig. 7, in which the groove g' in the plate a is below the level of the groove g, g, in the plate e. The wire is fed from the friction wheels through the guide tube O, then through a tubular passage O' in the plate e (Fig. 3), and then through a hole b (Fig. 7) in the cutter plate a, which is located above and a little farther out than the groove g'. The wire being fed through this hole in the cutter plate passes around through the groove g, g in the plate e until its entering end strikes the farther side of the plate a, as shown in Fig. 8. When the wire has been thus fed in, the upward movement of the plate a shears it off, and brings the grooves in the plates e and a so that the parts are ready for the formation of the bead. When the wire is cut off by the upward movement of the plate a, a short length of wire, equal to the thickness of the plate, is left in the hole b. This is pushed out by the next piece of wire entering and is carried along to t, where it is dropped from the machine, a portion of the jaw d'' being cut away as shown in Fig. 8 to allow for this. The upward movement of the cutter plate a is effected on the down stroke of the shaping head e by means of the lever Z pivoted to the plate at q. This lever has a horizontal flat surface p, p' at its inner end which rests upon the top of the plate e. The outer end of the lever is arranged to strike against the abutment R on the frame of the machine. When it does this as the shaping head moves down, the outer end of the lever is thrown up, and not being able to swing clear on account of the face p, p' resting on the plate e, the pivot q is carried up, and, in consequence, the cutter plate a to which it is attached. This cutter plate is thrown back to its original position ready for the feeding in of a new length of wire, on the up stroke of the shaping head. This is accomplished through the medium of the lever m (Figs. 3 and 4) pivoted to the head W at o. The outer end of this lever rests in a notch in the top of the cutter plate a, as is shown more clearly in Figs. 7 and 9. A stop n (Figs. 3 and 4) limits the upward movement of the lever m and consequently that of the cutter plate a, while the forming plate e is free to move upward. The cutter plate a is therefore displaced with reference to e until it has reached its original position. After the bead has been formed upon the article it is released from the groove g, g, by the withdrawal of the jaws d, d, d', d'' and the press is then ready for a repetition of the operation. This release is effected on the upward movement of the shaping head by the mechanism shown in Figs. 3, 4, 5 and 6. As previously stated, the radially movable jaws d, d, d', d'' are provided with upward extensions u which come in contact with the projection h on the plate k. When by the upward movement of the plate e these projections are forced against the extensions u, the jaws d, d, d', d'' are moved outward against the pressure of the springs c, thus uncovering the bottom of the annular channel in the plate e. This approach of the plates e and k while the plate e is rising is effected by means of the swinging arms p, p'. These arms are pivoted at U, U' on the frame X, X' of the machine, and are drawn together by the spiral spring Q. Inclined notches V, V' are cut in the inner side of these arms, near their

lower ends, and projecting pins S, S′, are attached to the head I and bear against the inner sides of the arms P, P′ holding them outward against the tension of the spring Q, as shown in Fig. 3. In this position, their lower ends clear the edge of the plate K, but when the pins S, S′ have entered the notches these arms are drawn together by the spring Q and their lower ends form stops for the plate *k*, as shown in Fig. 5. This is the position when the head I begins its upstroke. The plate *k* is centered upon the shank *e′* of the plate *e* and is free to move up and down upon it. It is normally kept in the position shown in Fig. 5, by the spiral springs *i*, *i*, shown in Fig. 3. When the head I begins its upward movement carrying with it the plate *e*, the plate *k* is not free to move upward as it is held down by the ends of the arms P, P′. The plates *e* and *k*, therefore, approach each other and the jaws *d*, *d*, *d′*, *d″* are thrown outward, uncovering the groove in the plate *e*. As the head I rises, the pins S, S′ gradually press the arms P, P′ apart, as shown in Fig. 6, until, when the pins have cleared the notches V, V′, the ends of the arms P, P′ are thrown out of contact with the plate *k*. When this occurs, the springs *i*, *i*, force the plate *k* up to its normal position, and the springs *c* force the jaws *d*, *d*, *d′*, *d″* back into the position shown in Fig. 5.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for wiring the edges of sheet metal vessels, the combination of a form adapted to hold the vessel to be operated upon in place, a reciprocating shaping head provided with a wire feeding device and an automatic cutting device by which the proper length of wire is cut off, means for holding the wire in the shaping head while the sheet metal edge of the vessel is being forced around it, and means for releasing the vessel when the wiring is complete, substantially as specified.

2. A shaping head for machines for wiring the edges of sheet metal vessels, consisting of a plate provided with a groove adapted to receive the wire and the edge of the vessel in combination with radially movable jaws secured to said shaping head and normally held in position to nearly close the groove therein, but adapted to be automatically opened to release the vessel when the wiring operation is completed, substantially as described.

3. In a shaping head for a machine for wiring the edges of sheet metal vessels, the combination of a shaping plate provided with a groove adapted to receive both the wire and the edge of the vessel, radially movable jaws by means of which the groove may be nearly closed during the operation of wiring, and a cutter plate moving across the groove, by means of which the wire is cut off a predetermined length, substantially as specified.

4. The combination, in a shaping head for machines for wiring sheet metal vessels, of a grooved shaping plate and a cutter plate reciprocating in the same, the parts being arranged so that the wire is fed through a hole in the cutter plate and around in the groove in the shaping plate until the entering end of the wire abuts against the cutter plate, when it is sheared off by the movement of this cutter plate, substantially as specified.

Signed at New York, in the county of New York and State of New York, this 11th day of September, A. D. 1891.

HENRY S. REYNOLDS.

Witnesses:
J. B. SABINE,
ERNEST C. WEBB.