(No Model.) 2 Sheets—Sheet 1.

C. D. KUBACH.

MECHANISM FOR FORMING AND SIZING CYLINDRICAL SHEET METAL VESSELS.

No. 466,692. Patented Jan. 5, 1892.

Fig. 1.

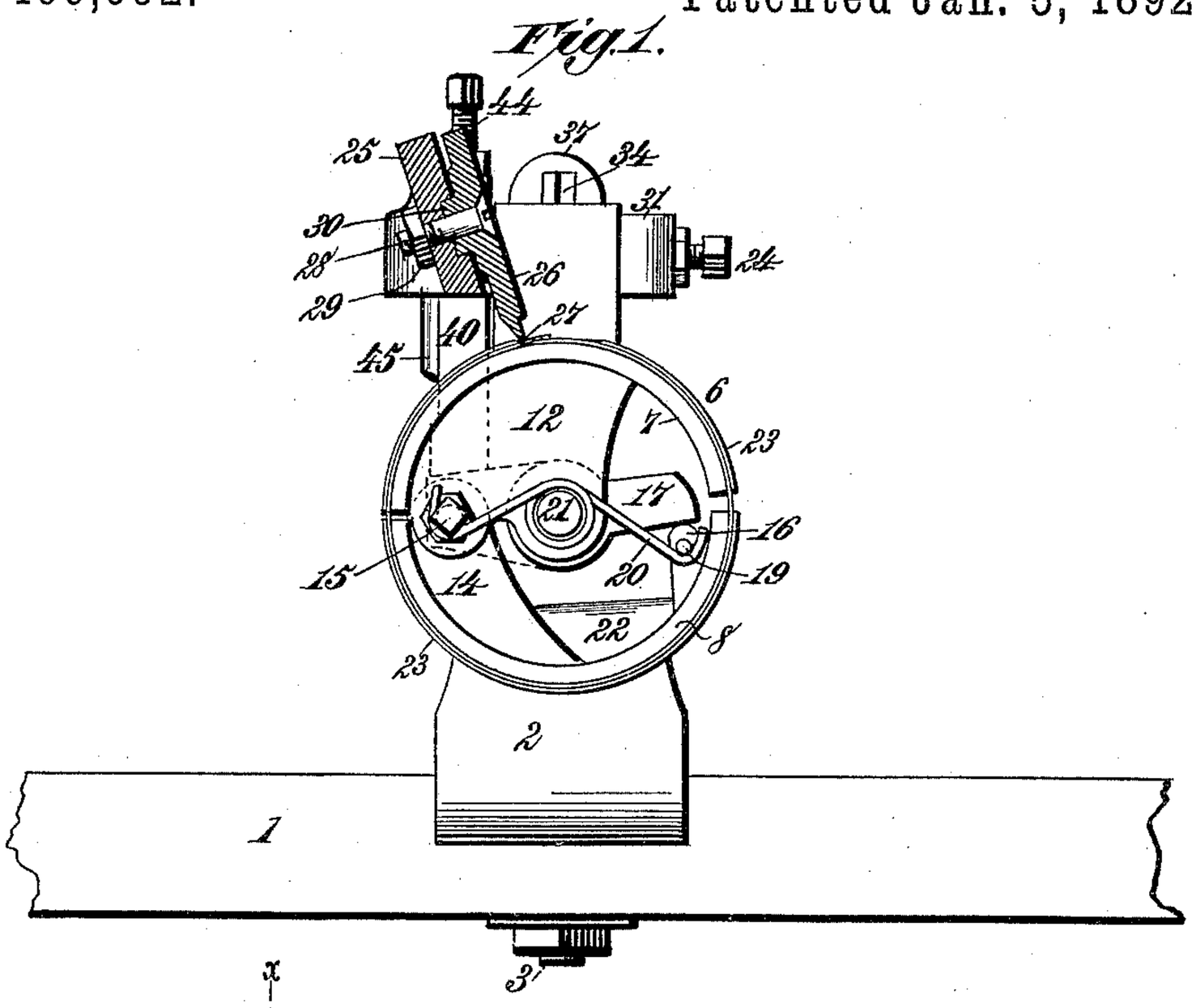
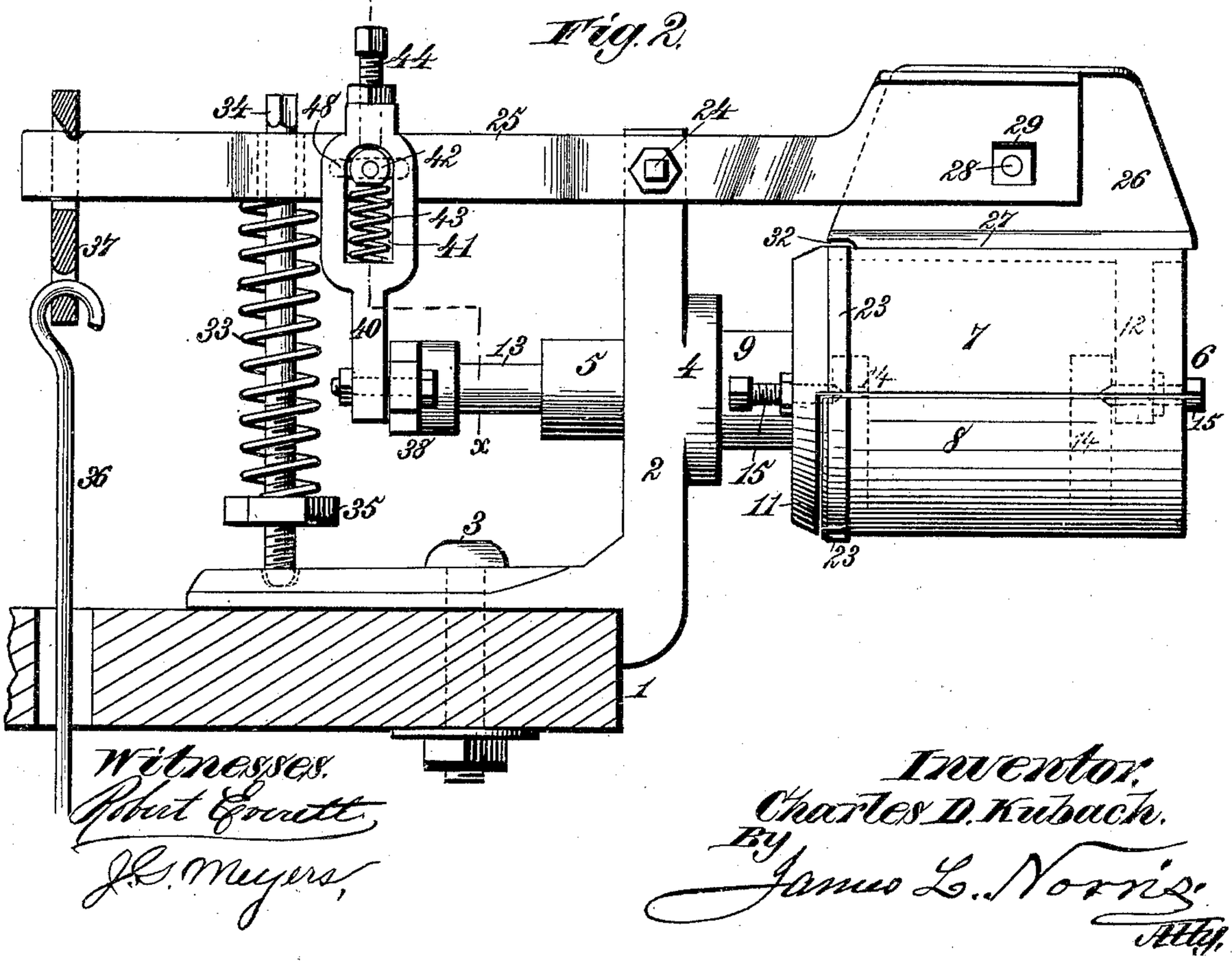


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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MECHANISM FOR FORMING AND SIZING CYLINDRICAL SHEET METAL VESSELS.

No. 466,692. Patented Jan. 5, 1892.

Fig. 3.

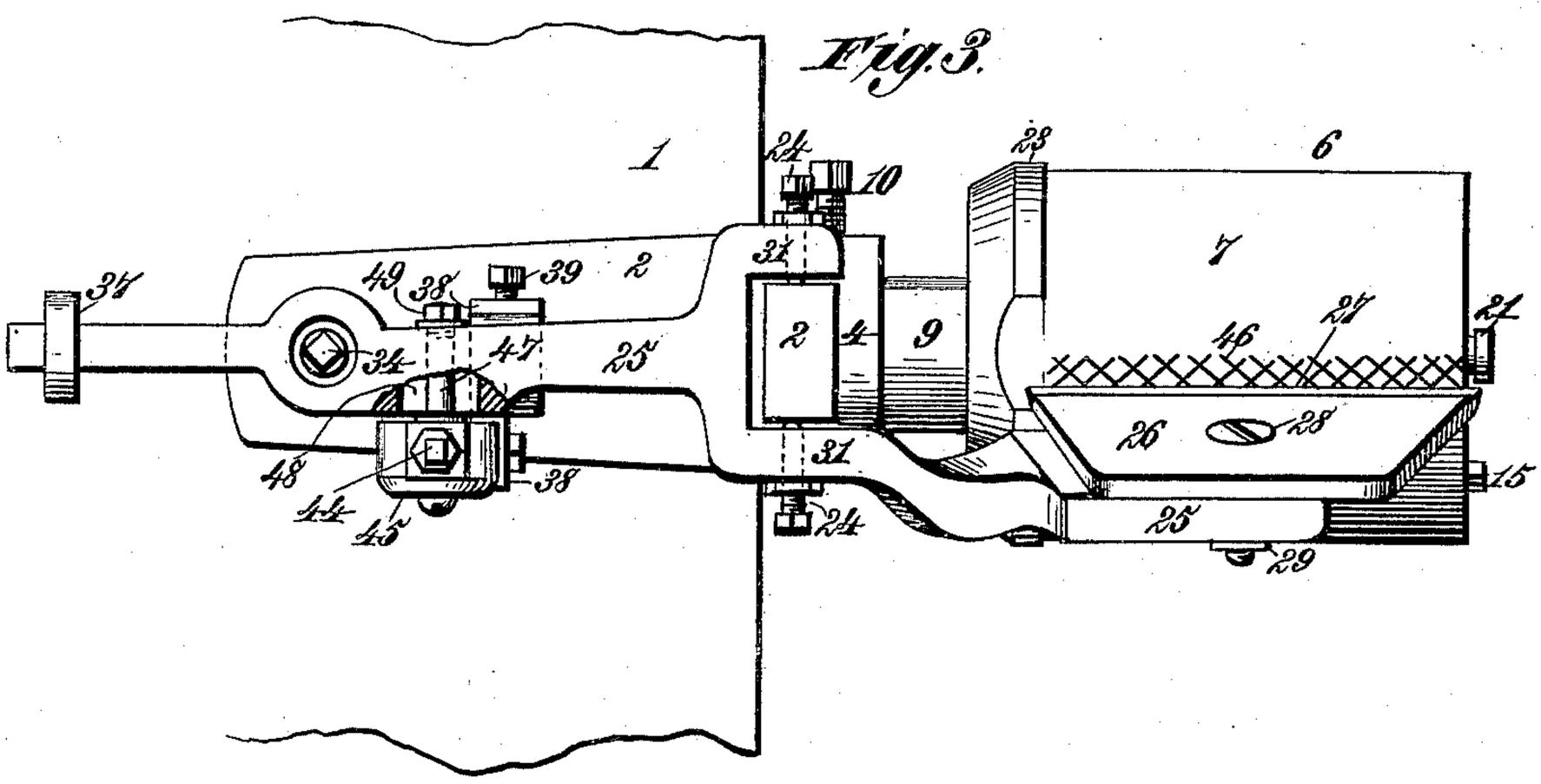

Fig. 4.

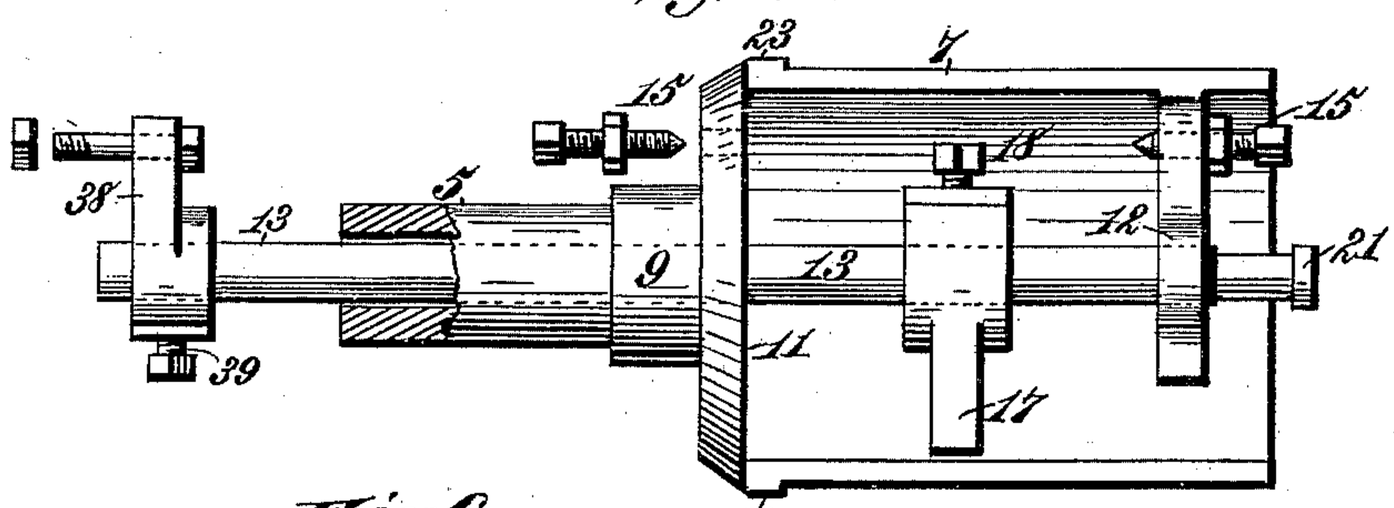

Fig. 6.

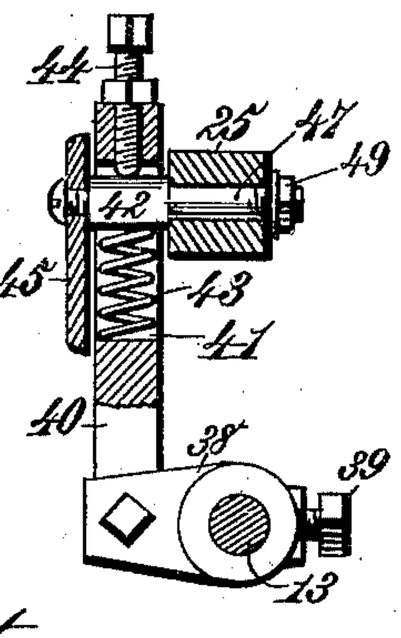

Fig. 5.

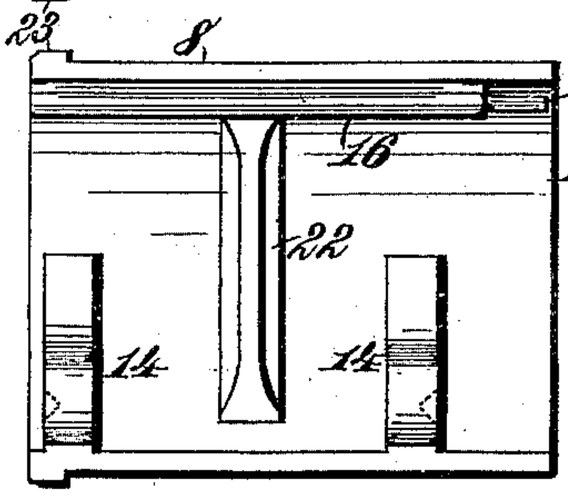

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES D. KUBACH, OF BALTIMORE, MARYLAND, ASSIGNOR OF TWO-THIRDS TO JOHN O'FERRALL, OF SAME PLACE.

MECHANISM FOR FORMING AND SIZING CYLINDRICAL SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 466,692, dated January 5, 1892.

Application filed October 22, 1889. Serial No. 327,757. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. KUBACH, a citizen of the United States, residing at Baltimore, State of Maryland, have invented new and useful Improvements in Machines for Forming and Sizing Cylindrical Sheet-Metal Vessels, of which the following is a specification.

The object of my invention is to provide a simple and easily-operated machine for forming and sizing cylindrical sheet-metal vessels, such as the cans that are extensively employed in the packing of fruits, vegetables, meats, and other products. In the manufacture of these sheet-metal cans it is necessary that the side seam or joint should be close and durable and that the exterior diameter of the cans should be uniform, notwithstanding variations in the thickness of the metal, so that the cylindrical portions of the cans will fit accurately within the flanged edges of the can tops and bottoms without requiring any crimping, molding, or other subsequent shaping.

In the annexed drawings, illustrating the invention, Figure 1 is a front view of my improved machine for forming and sizing cylindrical sheet-metal vessels. Fig. 2 is a side elevation of the machine. Fig. 3 is a plan of the machine. Fig. 4 is an inverted plan or inner side view of the upper stationary half of the forming and sizing cylinder, showing also the rock-shaft and attached lug or arm for pressing outward or expanding the movable half of said cylinder. Fig. 5 is a plan or inner side view of the movable half of the forming and sizing cylinder. Fig. 6 is a sectional detail on the line *x x* of Fig. 2, and Fig. 7 is a view of the spring for closing the expanded forming and sizing cylinder.

Referring to the drawings, the numeral 1 designates any suitable horizontal support, such as a bench or table, and 2 the frame of the machine, mounted on said support and secured thereto by a bolt 3 or otherwise.

In the upright portion of the frame 2 is formed an annular boss 4, in which is mounted the tubular arbor 5 of the non-revoluble forming and sizing cylinder 6, which consists of an upper stationary half 7, that is integral with said arbor, and a lower movable half 8, that is hinged to the stationary half of said cylinder. This cylinder 6 may be termed a "gaging-cylinder," as it gages the cans so that they will be of uniform exterior diameter, regardless of the thickness of the metal from which they are made.

On the arbor 5 is a shoulder 9, that bears against the front of the boss 4, and in one side of said boss, as shown in Fig. 3, is inserted a set-screw 10, that holds the hollow arbor 5 and attached stationary portion of the forming and sizing cylinder 6 rigidly in position. The stationary half of the forming and sizing cylinder is closed at its rear end by a disk or head 11, that is integral with or firmly secured to the arbor.

Within the open forward end of the stationary semi-cylinder 7 is a lug 12, that serves as a bearing for one end of a rock-shaft 13, that is passed through the hollow arbor.

The movable half 8 of the forming and sizing cylinder is provided internally with lugs 14, that are socketed or recessed on their outer sides to receive the ends of set-screws 15, passed through the head 11 and lug 12 of the stationary section or semi-cylinder 7, whereby the movable section or semi-cylinder 8 is hinged thereto.

Along the opposite inner side or edge of the movable semi-cylinder 8 is a ledge 16, which forms a bearing for the outer end of an arm 17, that is adjustably secured to the rock-shaft 13 by means of a set-screw 18, as shown in Fig. 4. From the forward end of the ledge 16 projects a pin 19, Fig. 5, for engaging one end of a spring 20, Fig. 7, that is centrally mounted on the forward end of the rock-shaft 13, the other end of said spring being engaged with one of the set-screws 15 on which the semi-cylinder 8 is hinged. A shoulder 21 may be provided on the end of the rock-shaft 13 to hold the spring 20 in place. The semi-cylinder 8 may be provided internally with a transverse strengthening-rib 22, if desired.

On the rear portion of the two halves of the forming and sizing cylinder 6 is an external annular shoulder 23, that serves as a stop and bearing for the rear end of the cylindrical metal blank or sheet to be formed and sized.

To the upper end of the frame 2 is fulcrumed by means of set-screws 24 an oscil-

latory lever 25, that carries at its forward end a knife or clamp 26, having a straight edge 27, that is adapted to bear on and securely clamp the metal blank. In order to provide for adjusting the clamp 26 so that its lower portion or straight edge 27 can be made to bear uniformly on the metal blank or sheet, said clamp is attached to the forward end of the lever 25 by means of a screw-bolt 28 and nut 29, as shown in Figs. 1 and 2. The clamp 26 is countersunk on one side to receive the head of the bolt 28, and on the opposite side, as shown in Fig. 1, is a nipple 30, through which the bolt passes and which is received in a recess formed in the oscillatory lever. This oscillatory lever 25 is provided with bifurcations 31 at the point where it is fulcrumed on the set-screws 24, which engage the upper part of the frame 2, as shown in Fig. 3. The forward portion of the lever 25 is turned to one side and slightly inclined, so that the attached clamp 26 will have a vertically-inclined bearing on the metal blank adjacent to the joint and hold the blank firmly without being in the way of permitting a proper application of solder to the joint. The rear end of the straight edge 27 may be slightly notched or cut away at 32, Fig. 2, for the purpose of permitting the clamp 26 to lap the annular shoulder 23, against which the rear end of the metal blank rests. The clamp 26 is held in forcible contact with the metal blank by means of a powerful spiral spring 33, encircling a vertical rod 34, that is stepped in the horizontal portion of the frame 2. The upper end of this rod 34 is passed through an opening in the rear portion of the lever 25. The upper end of the spring 33 bears against the under side of the lever 25, and its lower end rests on a nut 35, that is supported on the lower screw-threaded portion of the rod 34 and by which the tension of the spring 33 can be adjusted. The pressure of the clamp 26 is taken off the metal blank by means of a treadle, (not shown,) which connects by a rod 36, Fig. 2, with a link 37 on the rear end of the lever 25.

On the rear end of the rock-shaft 13 is a crank-arm 38, that can be adjusted to any desired position by means of a set-screw 39, Fig. 6. This crank-arm 38 is connected with the lever 25 by means of an adjustable and yielding link 40, having a slot 41, that engages a stud 42, projecting from one side of the lever. In the slot 41, beneath the stud 42 and bearing on the under side thereof, is a spiral spring 43, and in the upper end of the link 40, above the stud 42 and bearing thereon, is a vertical set-screw 44, by which the link can be raised or lowered to vary the throw of the crank-arm 38 and so limit the outward or expanding movement of the semi-cylinder 8 or movable portion of the forming and sizing cylinder. The link 40 is held on the stud 42 by a cap or washer 45, which may be large enough to conceal the spring 43, mounted in said link.

In operating the machine the attendant depresses the treadle to raise the clamp 26 and close or contract the forming and sizing cylinder 6, on which he then places a metal blank of approximately cylindrical form. The metal blank is placed well back onto the cylinder, the rear end of said blank resting against the annular shoulder 23 and the lateral edges of the blank lapped along the top of the cylinder, with the upper edge of said blank next to the clamp. The treadle is then released, thereby expanding the cylinder 6 and lowering the clamp 26 onto the blank, so as to hold it firmly. A suitable quantity of solder is then applied along the lap-joint by means of any convenient or proper implement, and the blank is allowed to remain in position until the solder becomes cooled and set. On the upper part of the forming and sizing cylinder, immediately beneath the point where the edges of the blank are lapped, is formed a corrugated surface 46, which affords a hold for the blank and facilitates cooling and "sweating in" of the solder. When the treadle is depressed to raise the clamp 26 and contract the cylinder 6, so as to permit the removal of the soldered blank and the placing of another onto the cylinder, the springs 33 and 43 will be compressed by the downward movement of the rear portion of the lever 25, and the descent of the link 40 will rock the shaft 13 in such a manner as to raise the arm 17 from the ledge or shoulder 16 and permit the spring 20 to raise or close the semi-cylinder 8, thereby contracting the forming and sizing cylinder, so that a blank can be readily removed and replaced. It will be seen that by the contraction of the forming and sizing cylinder it is readily disengaged from the soldered blank without any liability of the blank sticking or binding. After the soldered article has been removed and another blank placed in proper position on the cylinder the treadle will be released and the compressed spring 33 will oscillate the forward end of the lever 25 downward and carry the clamp 26 into contact with the blank on the cylinder, which is at the same time expanded by the upward movement of the link 40 acting on the crank-arm 38 so as to rock the shaft 13 and force the arm 17 into contact with the ledge 16 in the movable portion of the forming and sizing cylinder. This expansion of the cylinder 6 is effected gradually and firmly by reason of the elasticity of the spring 43, mounted in the link that connects the rock-shaft crank-arm with the main lever of the machine, and thus the blank is not jarred out of place before it becomes engaged by the clamp. It will be seen that the expansible forming and sizing cylinder 6 affords a firm and even support for the entire length of the metal blank, and thus permits the formation of a perfect and durable side seam or joint. It is also apparent that a single operator can easily attend two or three of these machines at once, as the joint formed on one

vessel will become cooled and set while other blanks are being adjusted and their joints formed on the other machines. By thus employing two or three machines of the same dimensions and adjustment one attendant can rapidly and accurately form and size a large number of vessels in readiness for the attachment of their tops and bottoms without requiring any subsequent fitting.

The machine is capable of adjustment within certain limits by raising or lowering the nut 35 to regulate the pressure of the clamp 26 and by raising or lowering the arm 17 and crank 38 to control or limit the expansion of the forming and sizing cylinder. By means of the bolt 28 and nut 29 the clamp 26 can be leveled to accurately engage the blank throughout its entire length, and by means of the set-screw 44 the link 40 can be adjusted to control the throw of the crank 38 in rocking the shaft 13 to expand the cylinder.

In order to improve the adjustment of the machine to different thicknesses of metal, the stud 42 may be provided with a shank 47, passed through a slot 48 in the lever 25 and secured by a nut 49 on the opposite side of said lever, so that by loosening the nut 49 the stud 42 can be adjusted in the slot 48 toward or from the fulcrum of the lever 25 to vary the throw of the link 40, according to differences in thickness of the metal blanks from which the cans or other cylindrical vessels are formed, and thereby enable the forming-cylinder 6 to be expanded just the proper distance to correspond to the thickness of blank employed. In changing the position of the adjustable stud 42 it will of course be necessary to adjust the crank 38 on the rock-shaft 13 in a corresponding degree.

What I claim as my invention is—

1. In a machine for forming and sizing cylindrical sheet-metal vessels, the combination of an expansible cylinder, a rock-shaft having an adjustable crank-arm and provided with means for expanding said cylinder, an oscillatory lever provided with an adjustable stud, and a link connecting said stud with the adjustable crank-arm on said rock-shaft, substantially as described.

2. The combination, with the cylinder 6 and the lever 25, countersunk on one side, of the clamp 26, having a nipple 30 to engage in the countersunk portion of the said lever, the bolt 28, and the nut 29, substantially as described.

3. The combination of the expansible cylinder 6, the rock-shaft 13, provided with means for expanding said cylinder, the adjustable crank-arm 38, the adjustable slotted link 40, the lever 25, carrying the clamp 26 and provided with the longitudinal slot 48, the adjustable stud 42, engaged in the slotted link 40 and having a shank 47 passed through the slot in the said lever, and the spring 43, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES D. KUBACH.

Witnesses:

JNO. P. O'FERRALL,

JAMES E. CARR, Jr.