(No Model.) 2 Sheets—Sheet 1.

T. REIS.

TINNER'S CUTTING, FLANGING, AND JOINING MACHINE.

No. 547,183. Patented Oct. 1, 1895.

Fig. 1.

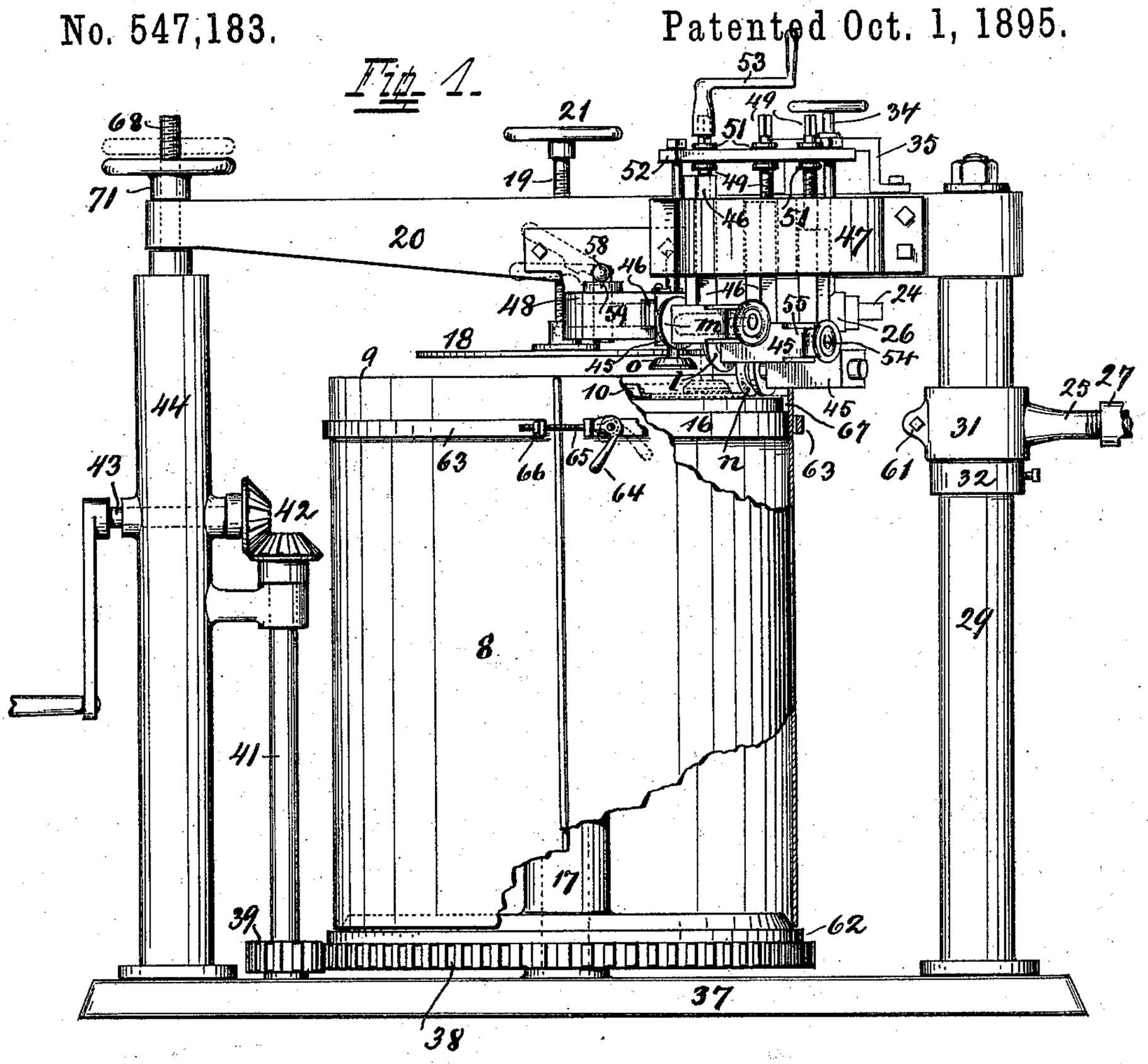
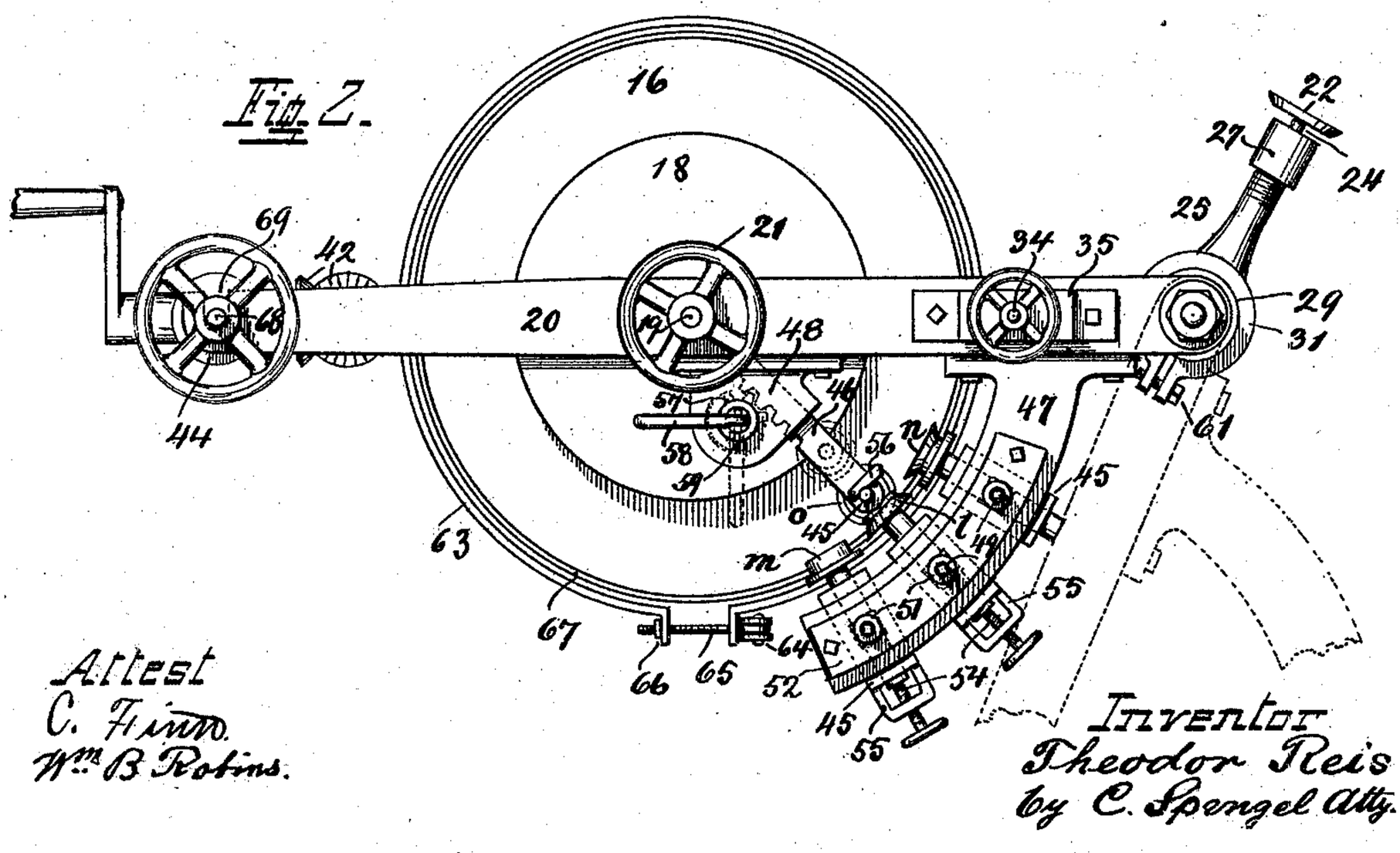


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

T. REIS.

TINNER'S CUTTING, FLANGING, AND JOINING MACHINE.

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Fig. 3.

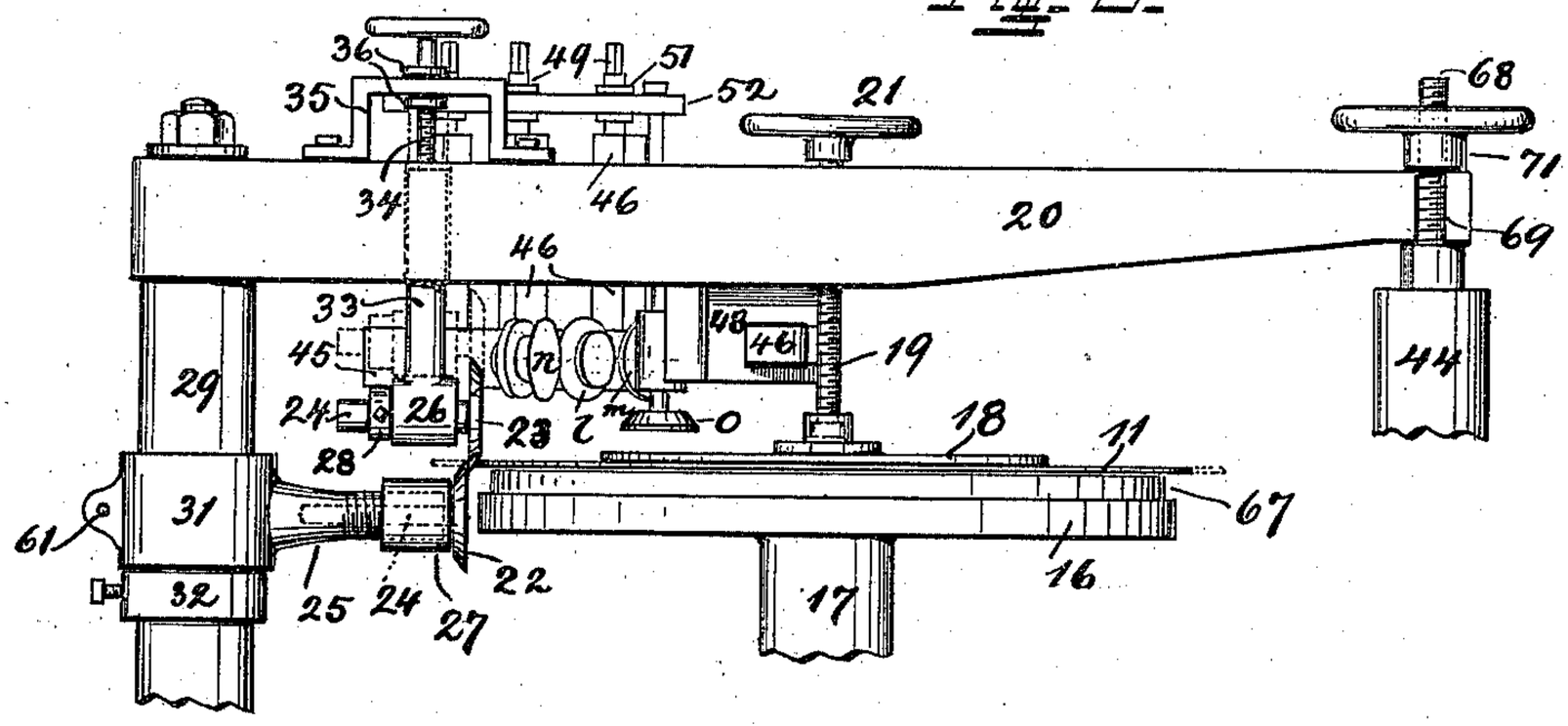


Fig. 4.

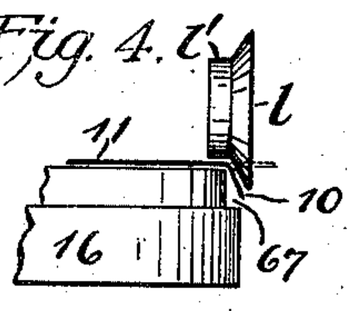


Fig. 5.

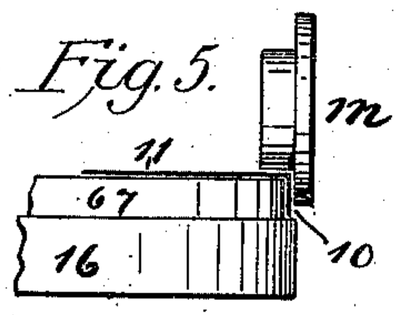


Fig. 6.

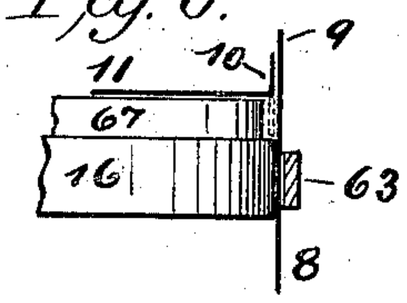


Fig. 7.

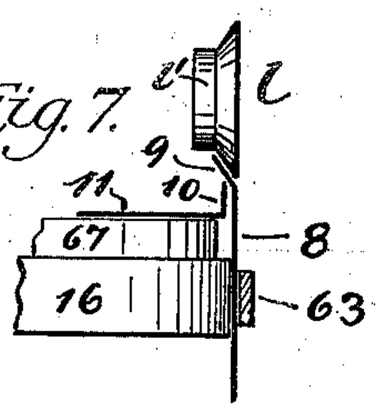


Fig. 8.

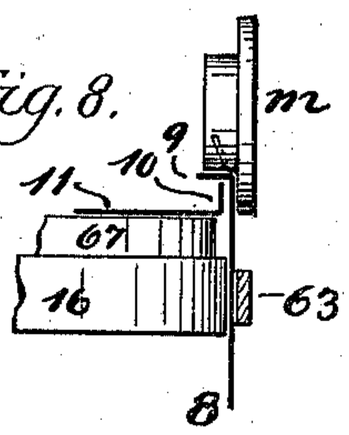


Fig. 9.

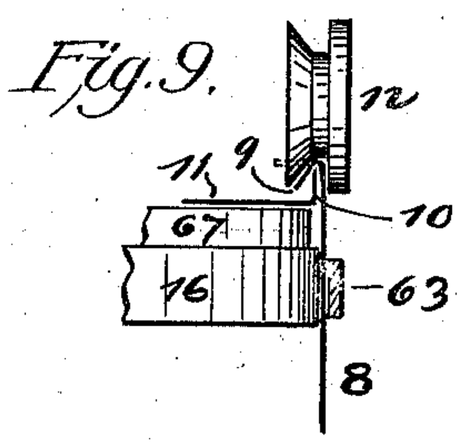


Fig. 10.

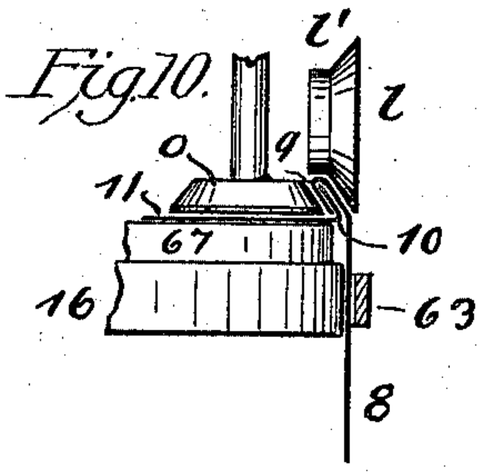


Fig. 11.

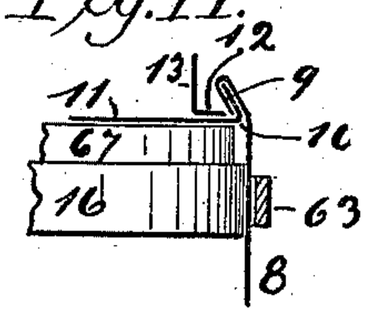


Fig. 12.

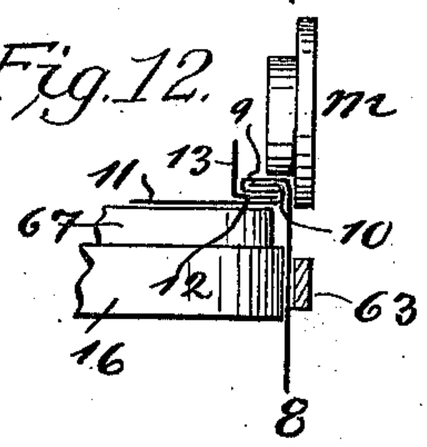
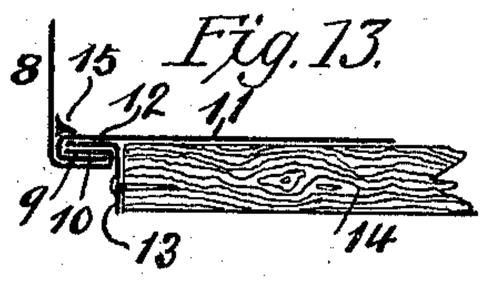


Fig. 13.



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Inventor
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UNITED STATES PATENT OFFICE.

THEODOR REIS, OF CINCINNATI, OHIO.

TINNER'S CUTTING, FLANGING, AND JOINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 547,183, dated October 1, 1895.

Application filed December 19, 1894. Serial No. 532,327. (No model.)

To all whom it may concern:

Be it known that I, THEODOR REIS, a citizen of the United States, and a resident of Cincinnati, Hamilton county, State of Ohio, have invented a new and useful Tinner's Cutting, Flanging, and Joining Machine; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the letters and numerals of reference marked thereon, which form a part of this specification.

This invention relates to machines to be used in the manufacture of round vessels when made of tin or other sheet metal, its particular function being to prepare and join the ends or bottoms to the round bodies by folding and locking their adjoining edges which form the seam to each other.

In the following specification, and particularly pointed out in the claims at the end thereof, is found a full description of my invention, its operation, parts, and construction, which latter is also illustrated in the accompanying two sheets of drawings, in which—

Figure 1 is a front elevation of the machine complete with the inverted body of a can and its bottom in position to be joined to each other. Parts of the body are shown broken away to disclose to view parts which would be otherwise covered. Fig. 2 is a top view of the parts shown in Fig. 1. Fig. 3 is a rear elevation of the upper part of the machine with a bottom in position to be cut to its circular shape and afterward flanged.

Figs. 4, 5, 6, 7, 8, 9, 10, 11, and 12 are a number of diagrams showing, successively, the different shapes and positions which the adjoining metal edges assume while they are being connected, as well as the corresponding shapes and positions of the roller-dies which are being used during the process of construction.

Fig. 13 in a sectional diagram shows the completed joint and its application.

These diagrams will be properly explained and referred to whenever necessary during the description of the construction and operation of the machine. The joint which this latter is intended to make is shown in my Patent No. 516,403, and is mostly used on large vessels, like oil-cans, which have their metal bottoms protected by a wooden one below, which latter is held in position by a metal hoop. This latter, as well the metal bottom, have each a flange whereby they are secured to the body of the can by one common joint.

Referring particularly to Fig. 13, 8 indicates the body of the can, the lower end 9 of which is turned over and doubled up around a flange 10 on the bottom 11. These parts are turned in and pressed down over flange 12 of the hoop 13 and against the bottom, whereby this latter, together with the hoop, is secured by one joint. The wooden bottom 14 is finally affixed within hoop 13 in any suitable way. (Not by this machine.) Where no wooden bottoms are used, hoop 13 may be omitted, which leaves the joint for connecting the bottom practically the same. In either case the joint is completed by the application of solder 15 from the inside. The first step is to cut the bottom to the required circular shape, for which purpose a piece of tin, intended to form bottom 11, is placed upon a circular holder or turn-table 16, supported on a pillar 17. (See Fig. 3.) It is held in position thereon by a circular flat clamp 18, carried by a screw 19, working in a cross-beam 20 and operated by a hand-wheel 21. The cutting is done by rotary shear-blades 22 and 23, each carried by a shaft or spindle 24, which is loosely supported in bearings 25 and 26. These cutters are adjustable in their bearings, to be set according to the size required for the bottom. They are held in their adjusted positions, in one direction, each by the other, while the lower cutter is prevented from moving inwardly by a screw-collar 27, adjustable on the outside of bearing 25, and the upper cutter is prevented from moving outwardly by a collar 28, adjustable by means of a set-screw on spindle 24. These cutters are further also vertically adjustable, the lower one on a pillar 29, on which it vertically slides by means of a band 31, from which its bearing 25 projects and which band rests on a collar 32, also adjustable on pillar 29 and held in position thereon by means of a set-screw. The bearing 26 of the upper cutter is provided with a shank 33, adjustably fitted in an opening in cross-beam 20, and adjusted and held in position by a screw 34, taking into the upper

end of said shank and confined longitudinally on a bridge 35 by means of collars 36. The tin blank for the bottom being in position and the cutters having been properly adjusted to it, table 16, with said tin blank on it, is now rotated once, whereby the latter is carried through between the cutters, the ensuing friction causing them to revolve against each other and severing the metal on a round line. For the purpose of rotating the table, pillar 17 is suitably mounted upon a suitable base 37, and provided with a gear-wheel 38, which meshes into a pinion 39 on an upright shaft 41. This latter is held in suitable bearings, and by means of bevel-gear connection 42 and a crank-shaft 43, supported on a pillar 44, the operation of the parts—that is, rotation of turn-table 16—is readily obtained. After the bottom is cut out, flange 10 is formed thereon by turning that part of it which projects beyond the edge of the table down on the side of the latter, such table being of the exact size which the bottom requires, the latter being cut larger to provide the necessary metal for its flange. This is done by roller-dies forming part of a group *l*, *m*, *n*, and *o*, which are constructed and operate as follows: They are all connected to and carried by spindles which are loosely supported in boxes 45, so as to be capable of rotation therein. These boxes are all connected to shanks 46, by which they are adjustably supported in case of dies *l*, *m*, and *n* within an arm 47, and in case of die *o* within a housing 48, both connected to arm 20. For this adjustment, which as to the three first-named dies is vertical, screws 49 are provided, each having two collars 51, one above and one below a shelf 52, whereby they are confined longitudinally to the latter, but free to rotate. The lower ends of these screws take into the screw-threaded upper ends of shanks 46, so that when the square upper ends of said screws are turned by a suitable implement 53 said shanks, with boxes 45 and the roller-dies supported therein, may be vertically adjusted to any desired height. For their horizontal adjustment they are simply pushed in or out, moving with their spindles within boxes 45. They readily retain their adjusted position, being held thereto by the work they operate upon, and only in case of dies *l* and *m* means have to be provided to prevent them from being crowded outwardly, which means consist of screws 54, carried in brackets 55, connected to boxes 45, and which are caused to bear against the rear ends of the spindles after the respective dies have been adjusted. As to die *o*, no vertical adjustment is needed beyond its capacity to be raised up vertically to a fixed position when not used, and in which position it is held by a catch 56, pivoted to the box of its spindle and engaging with a notch on the latter after the die is raised up. When down and in its operative position, nothing is required to hold it therein. It simply rests by its weight on the tin bottom and no tendency exists to lift it off therefrom. For its horizontal adjustment the rear part of its shank 46 is toothed to form a rack which engages with a pinion 57, the shaft of which rotates within bearings in housing 48. This shaft carries on its upper end a lever 58, whereby the pinion may be turned, causing by its engagement with the toothed rack die *o* on the latter to move horizontally in or out. The die is locked in its adjusted position by notches 59 cut in the upper surface of the bearing for the pinion-shaft in housing 48, and into which the sharp-edged under side of lever 58 drops after adjustment, the latter being pivotally connected to the upper end of the pinion-shaft to permit it to be vertically moved in or out of notches 59, which are provided below such lever. (See dotted lines in Fig. 1, which show such lever down in its normal position and also slightly raised for adjustment.)

To revert again to the operation of finishing the bottom by providing it with its flange 10, the procedure is as follows: Cutters 22 and 23 are first moved away from the table, cutter 23 being raised up vertically by means of screw 34, the other one being swung outwardly, as shown in Figs. 1 and 2, for which purpose set-screw 61 is loosened, whereby the open band 31, which carries said cutter, had been thus far tightly clamped to pillar 29. During this movement and while so turning, this band rests on collar 32. The preparatory beveled die *l* is now used first, and being properly adjusted horizontally, first above that part of the bottom which stands over the table edge, (see Fig. 3,) it is next adjusted vertically—that is, screwed down against the metal until it bends the latter at the point where it comes in contact with it to a shape as shown in Fig. 4. All other roller-dies having been moved within the limits of their adjustment, in a manner to be out of the way, the table is now rotated, as previously described, whereby the balance of the projecting metal is forced down and caused to assume a similar shape all around. The flange is now completed—that is, bent to a sharp right angle by the flanged die *m*, which is properly adjusted—that is, first screwed down against the table, then against the side of the same to completely bend the metal, (see Fig. 5,) after which the table is rotated as before, with the result that a similar angle is imparted to the flange all around. The bottom is now ready for connection to the body, and while I proceed to describe such connection as being the next step now, it does not, in fact, follow the completion of each and every bottom, it being more practical and advantageous to finish first a number of bottoms on one adjustment of the machine before going any further, whereby the time is saved which the recurring adjustments from one position to another would otherwise require. To continue again, the cylindrical body 8, (see Fig. 1,) previously completed, is let down over table 16 and rests on a flange 62, the diameters of the two latter being of a

size to closely accommodate the interior diameter of the body, so that the latter is properly held and maintained in an upright position. To permit its placing in the manner described, clamp 18 is first raised off from the table, its services being not required now, and beam 20, which carries it and arm 47, with the roller-dies, is swung away from above the table, it being for such purpose pivotally connected to pillar 29, whereby the space above the table becomes completely cleared. (See dotted lines in Fig. 2.) After the body is placed, a band-clamp 63 is applied around its outside at a height which brings it opposite the edge of table 16, the open ends of which are tightly drawn together by means of an eccentric lever 64, which acts upon a screw 65, passing loosely through the outwardly-turned ends of the band. A nut 66 is further provided on one end of this screw, whereby the band may be drawn together as tightly as possible, the object being to hold the body 8 to the turn-table in a manner to prevent it from slipping thereon and cause it to rotate with the latter. The flanged bottom having been previously taken off is now replaced again on table 16, but with its flange turned up. (See Fig. 6.) The height of the table is so adjusted, or what is the equivalent the length of the body is cut to such a dimension, as to cause the edge 9 of it to project above the table and above flange 10 of the bottom thereon. (See same figure.) The latter then comes to be within the body and occupies the same position therein which it occupies later after the joint is completed. The necessary reduction of the bottom's diameter, to permit it to be thus inserted within the body, is obtained by means of a recess or reduction 67 on the upper part of the side of the table and into which recess the flange 10 is being formed, the depth of the former being sufficient to accommodate the thickness of the metal. The parts being thus placed, beam 20, with all its appendages, is swung back again onto the top of pillar 44, where a screw-threaded post 68 passes into a notch 69 in said beam, after which a lock-nut 71 on post 68 is screwed against the beam, and the latter thus locked in position. Preparatory roller-die *l* is adjusted horizontally and vertically against the edge 9 of the body, which projects above flange 10 of the bottom, such adjustment being continued until said edge 9 is started inwardly over flange 10, as shown in Fig. 7, after which, die *l* being held immovable by screws 49 and 54, the table is rotated and the projecting edge 9 turned in all around over flange 10. Previously-used dies being now, as well as at all other times when not needed, adjusted first to be out of the way, roller-dies *m* and *n* are now successively used, each being adjusted to a position, as shown in Figs. 8 and 9, and the table is turned each time, whereby the projecting part 9 of the body is turned completely over and doubled up around flange 10. The thus-far completed joint, being now three thicknesses of metal, is now again started inwardly by the beveled die *l*, (see Fig. 10,) the additional bevel-die *o* being used on the inside to prevent, in conjunction with the square shoulder *l'* of die *l*, the seam from opening. The construction whereby this die *o* is supported and adjusted has been explained before. It is adjusted to position first before die *l* is used, the seam being in a condition as shown in Fig. 9. Next bevel-die *l* is adjusted against it, as shown in Fig. 10. The two dies being now in proper position the table is rotated, putting the joint in a condition as shown in Fig. 11, after which the flanged hoop 13, previously completed, is set in, resting with its flange 12 against the bottom 11, as shown in Fig. 11. Die *m* is now adjusted in a manner as shown in Fig. 12, whereby the joint is pressed down against bottom 11, locking flange 12 of the hoop between it and the bottom. The hoop is thus securely connected. The whole joint is now completed, as far as this machine is concerned, by a close compression of all the engaging metal ends, being the doubled-up end 9 of body 8, flange 10 of the bottom between it, and flange 12 of hoop 13 between the three. The compression is completed, if necessary, by repeated rotations of table 16 with the whole can after a previous closer adjustment each time of die *m*. Beam 20 is now released from lock-nut 71 and swung out to clear the table, band-clamp 63 is loosened, and the can is lifted off. The wooden bottom 14 (see Fig. 13) may be inserted now or before the can is lifted off from the table. The joint is finally made liquid-tight by solder 15, applied from the inside. (See same figure.) It is obvious that different joints, but of a similar character, may be formed by substituting differently-shaped dies or by using the present dies in a different manner. A joint may be formed as shown in Fig. 9, or it may be formed as explained and shown in Fig. 12, but with the hoop omitted. The cutting feature (cutters 22 and 23) may be left off.

The details of construction may be variously changed without departing from the general plan and intent of the invention, which change refers particularly to the manner whereby the horizontal and vertical adjustment of the roller-dies is obtained. Neither is it necessary to connect the support 47, which carries the roller-dies, to a swinging beam 20. They may be connected to a stationary support, their horizontal adjustment being sufficient to clear the table for the admission of body 8.

Having described my invention, I claim as new—

1. In a machine for the purpose described, the combination of a rotary holder or table adapted to support a metal blank, a vertically adjustable clamp to hold the latter on the former, a beam 20, which holds the clamp, a pillar 29, which supports beam 20, circular cutters 22 and 23, each provided with a spin-

dle, bearings 25 and 26, within which these spindles adjustably rest, a band 31 whereby bearing 25 is adjustably secured to pillar 29 and a shank 33 whereby bearing 26 is adjustably supported on beam 20.

2. In a machine for the purpose described, the combination of a rotary holder or table 16, adapted to support a metal blank, a clamp to hold the latter in position thereon, a recess 67 in the upper part of the side of the table, a bevel-flanged roller die *l* and a square flanged die *m*, each provided with spindles and adjustably supported near the edge of the table and at right angles to the latter for the purpose of forming in conjunction with such edge a flange on the metal-blank by forcing part of it against said edge and into recess 67 thereon.

3. In a machine for the purpose described, the combination of a rotary holder adapted to support the bottom and body of a metal can in a position they relatively occupy in the completed can, a removable band-clamp 63 to hold the body of the can to the holder being clamped around the latter so as to rotate therewith with the bottom between and a set of suitably shaped roller-dies, adjustably supported near the edge where body and bottom are to be connected, for the purpose of forming the joint.

4. In a machine for the purpose described, the combination of a rotary holder consisting of a table 16 for the bottom of a can to rest upon and having a flange 62 below it to support the can-body, the latter and the bottom being in the position they relatively occupy in the completed can, by reason of the distance between the surfaces upon which they are supported and which distance corresponds with the depth of the can, means to hold the can-body to the holder to cause it to revolve therewith and a set of suitably shaped roller-dies, adjustably supported opposite the edge of table 16 at which point the joint is formed whereby body and bottom are to be connected.

5. In a machine for the purpose described, the combination of a pillar 17 supported in a manner to be capable of rotation in its upright position, a disk-shaped flange 62 at its lower end to support the body of a sheet-metal can, a table 16 at the upper end of pillar 17 being of a size and in a position to be capable of centering the can-body and also support within the latter the can-bottom in the position it relatively occupies in the completed can, a gear-wheel on pillar 17, a pinion 39, for driving it, means to rotate the pinion-shaft and a set of suitably shaped roller-dies, adjustably supported near the upper edge of table 16 where body and bottom are to be joined, for the purpose of connecting them.

6. In a machine for the purpose described, the combination of a rotary holder adapted to support the bottom and body of a sheet-metal can in the position they relatively occupy in the completed can, a band-clamp 63 to hold the body to the holder, a beam 20 pivotally supported above the holder, adapted to be locked in position and capable of being swung aside and a set of suitably shaped roller-dies carried by said beam and capable of being adjusted, toward and from the edge where body and bottom are to be joined, for the purpose of connecting them.

7. In a machine for the purpose described, an upright spindle or pillar 17, supported in a manner to be capable of rotation in its upright position, having a disk-shaped flange 62 at its lower end to support the body of a sheet-metal can and a table 16 at its upper end, such table being of a size and in a position to be capable of centering the can-body while supporting within the latter at the same time the can-bottom in the position it relatively occupies in the completed can, in combination with a set of adjustable roller-dies, to form the joint between body and bottom, having the bevel-edged dies *l* and *o* which are supported at right angles to each other and adjustable to and from each other and to and from the edge of the table 16, which supports the can-bottom and on which the joint is to be formed.

8. In a machine for the purpose described, the combination of a rotary holder in two parts, one below the other, the upper part being adapted to support the bottom and the lower part supporting the body of a sheet-metal can in the position they relatively occupy in the completed can, means to hold the body to the holder to cause it to rotate therewith, the vertical roller-dies, being die *m*, having a square flange, the bevel-edged die *l*, the grooved die *n*, having a square and a beveled flange and the horizontal bevel-edged die *o*, all supported on a frame on which they are capable of being adjusted toward and from the edge of the upper part of the holder where body and bottom meet to be joined for the purpose of connecting them.

9. In a machine for the purpose described, the combination of a rotary holder adapted to support the bottom and body of a sheet-metal can in the position they relatively occupy in the completed can, means to hold the body to the holder, a beam 20, a pillar 29, on which the beam is pivotally supported, a set of roller-dies, a clamp 18, and a cutting die 23, all carried by beam 20 and adjustable thereon and a cutting die 22, the bearing of which is pivotally supported on pillar 29, and whereby it may be swung in or out of adjustment.

10. In a machine for the purpose described, the combination of a rotary holder adapted to support the bottom and body of a sheet-metal can in the position they relatively occupy in the completed can, a band-clamp 63 to hold the body to the holder, a bolt 65, passing through the open ends of the said band, means to draw the open ends together on said bolt and a set of adjustable roller-dies to form the joint between the parts to be connected.

11. In a machine for the purpose described,

the combination of a rotary holder adapted to support the bottom and body of a sheet-metal can in the position they relatively occupy in the completed can, means to hold the body to the holder, a set of roller-dies mounted on spindles to form the joint between the parts to be connected, boxes in which said spindles are adjustably carried, shanks to which said boxes are connected and which shanks are adjustably secured in suitable supports.

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

THEODOR REIS.

Witnesses:
C. SPENGEL,
C. FINN.