

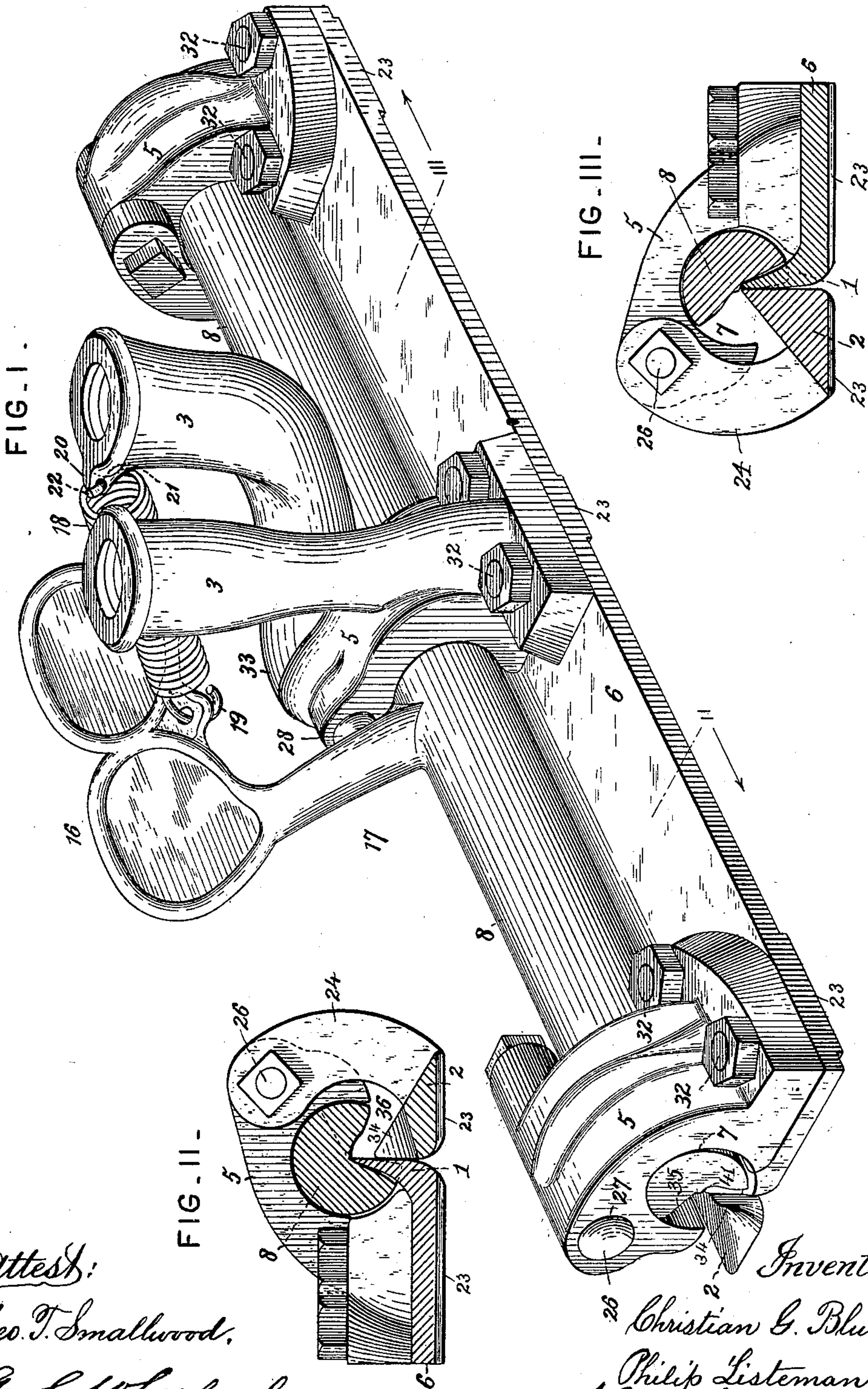
(Model.)

3 Sheets—Sheet 1.

C. G. BLUM & P. LISTEMAN.
ROOFING TONGS

No. 404,678.

Patented June 4, 1889.



Attest:
Geo. T. Smallwood,
Geo. L. Wheelock

Inventors:
Christian G. Blum
Philip Listeman
by Knight Bros. Attys

(Model.)

3 Sheets—Sheet 2.

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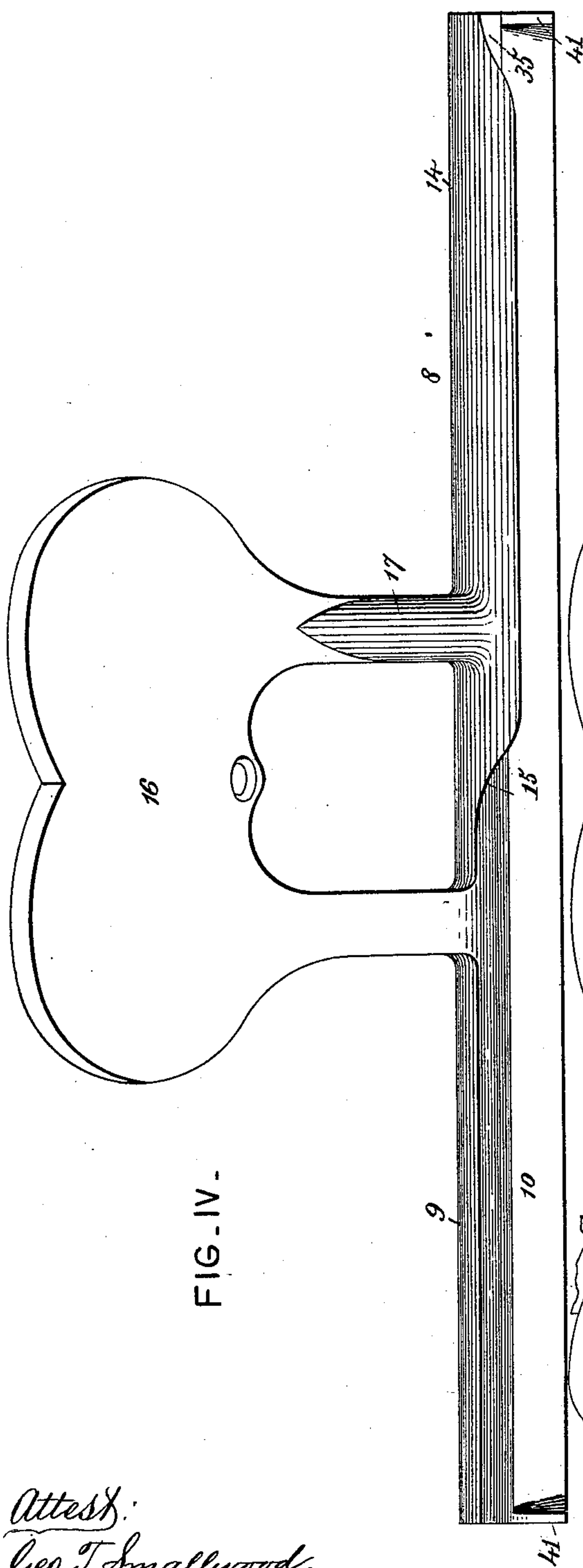


FIG. IV -

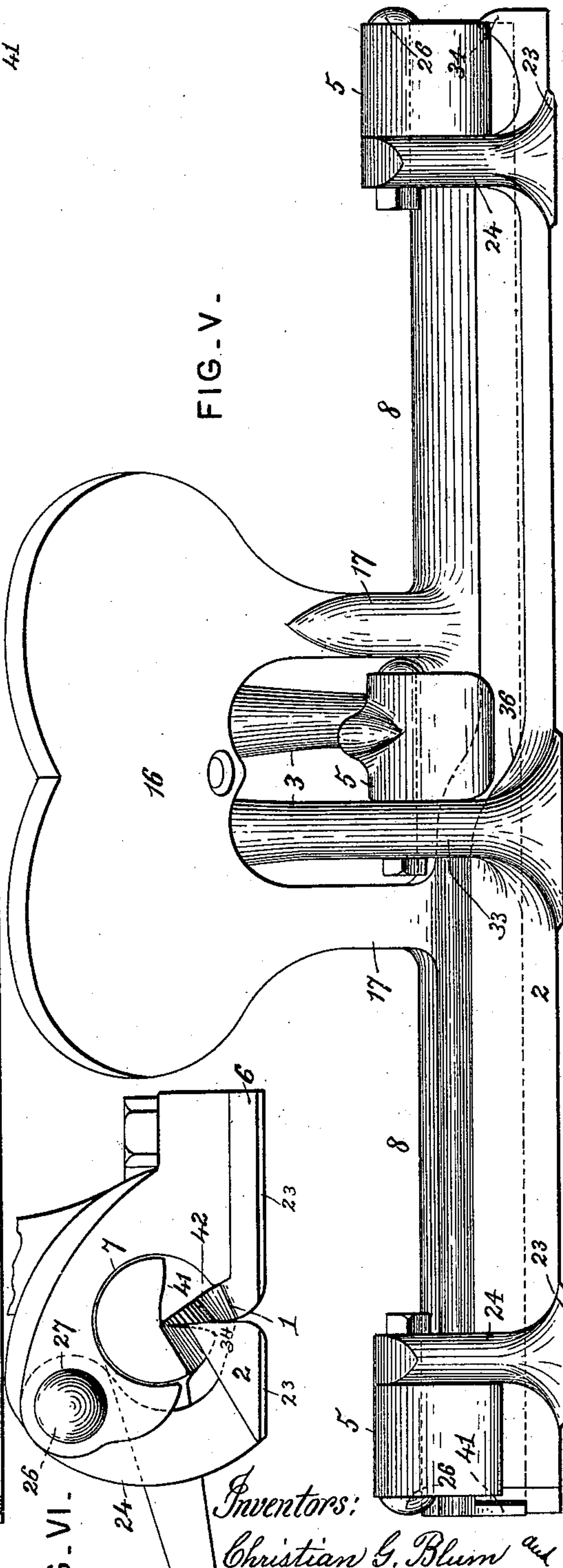


FIG. V -

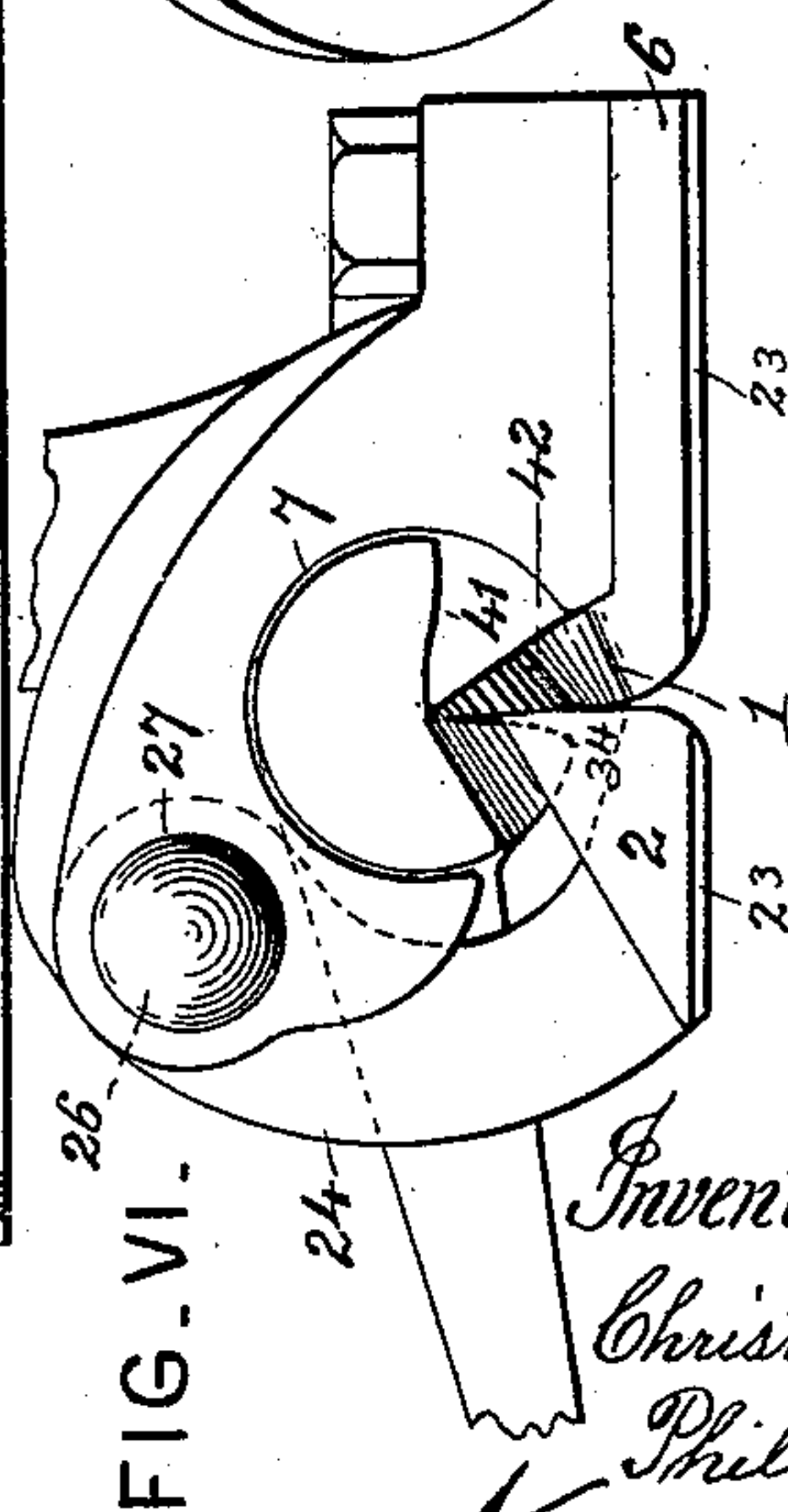


FIG. VI -

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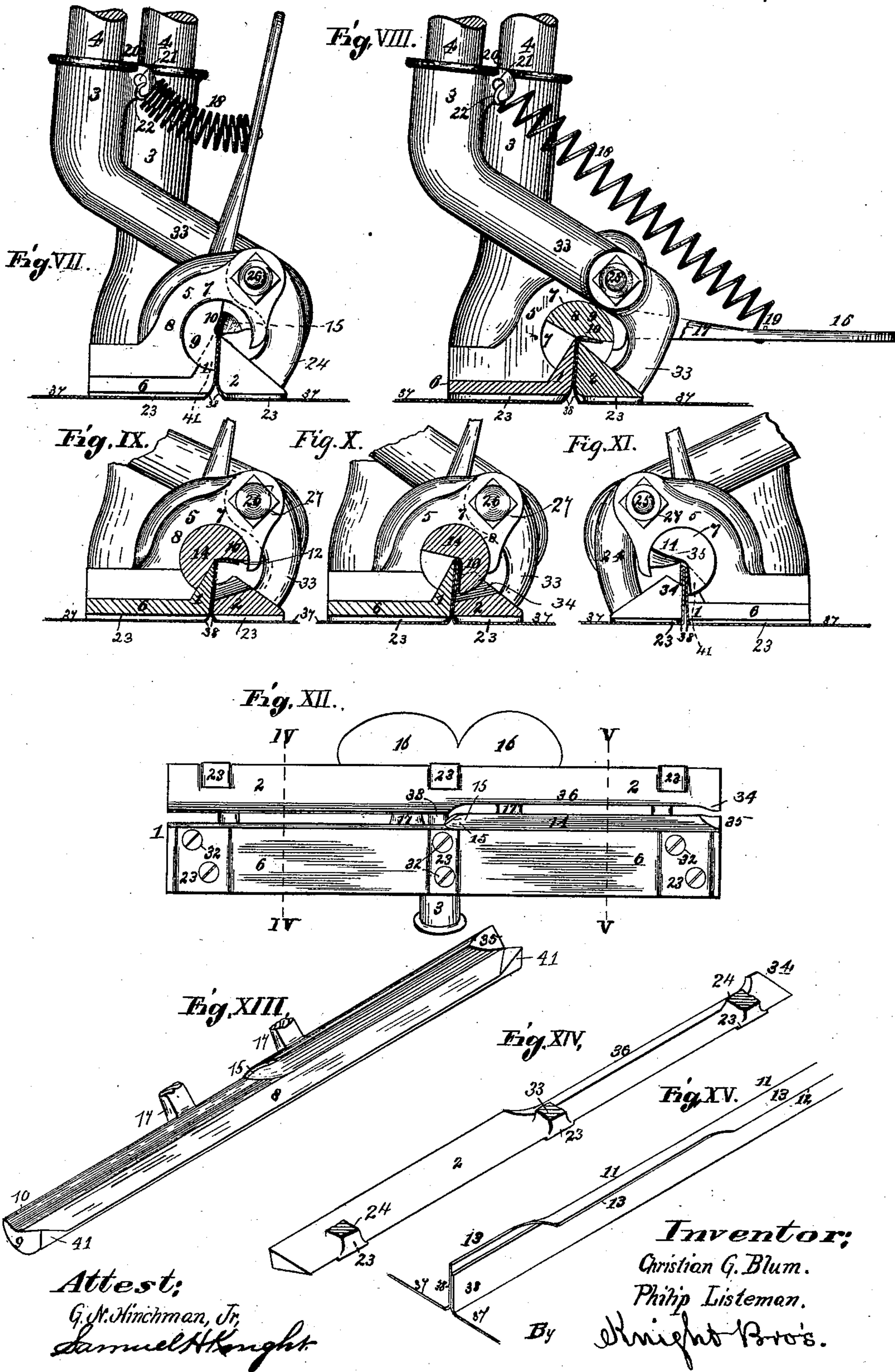
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Attest:

G. M. Hinchman, Jr.
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Inventor;
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Philip Listeman.

By Knight Bros.

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UNITED STATES PATENT OFFICE.

CHRISTIAN G. BLUM AND PHILIP LISTEMAN, OF COLLINSVILLE, ILLINOIS.

ROOFING-TONGS.

SPECIFICATION forming part of Letters Patent No. 404,678, dated June 4, 1889.

Application filed August 28, 1888. Serial No. 283,983. (Model.)

To all whom it may concern:

Be it known that we, CHRISTIAN G. BLUM and PHILIP LISTEMAN, both of Collinsville, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Roofing-Tongs, of which the following is a specification.

This invention relates to a machine for seaming metal roofs; and the invention consists in features of novelty to be hereinafter fully described, and then particularized in the claims.

In the accompanying drawings, Figure I is a perspective view of our improved roofing-tongs. Fig. II is a sectional view on the line indicated by II, Fig. I, and looking toward the left of said figure. Fig. III is a sectional view on the line indicated by III, Fig. I, and looking toward the right of said figure. Fig. IV is a detached view of the bending-bar, showing also the treadle formed therewith. Fig. V is an elevation looking toward the opposite side of Fig. I. Fig. VI is an end elevation looking toward the right of Fig. V, the treadle and handle-sockets being broken off. Fig. VII is an end elevation and shows the initial end of the tongs gripping the adjacent sections of the tin together. Fig. VIII is a vertical section, partly in elevation, of the tongs, with one shank of the treadle broken away to show the action of the bending-bar, the bending-bar being turned down by the operation of the double foot-treadle and the overlap tin given its initial bend by the working-face of said bar. Fig. IX is a vertical section on line V V, Fig. XII, and shows the finishing-section of the bending-bar, which is in position to make the final bend of the overlap-section of the seam. Fig. X is a vertical section on line V V, Fig. XII, and shows the finished (single-seam) work of the bending-bar. Fig. XI is an end view looking toward the left of Fig. I. Fig. XII is a bottom view of the tongs and bending-bar, and shows the projected surfaces on the jaws of the tongs that hold said jaws in non-interference with the cross-seams of the tin. Fig. XIII is a perspective view of the bending-bar. Fig. XIV is a perspective view of the front jaw of the tongs. Fig. XV is a perspective detail view of the seam, and shows the position of the adjacent sections of tin relatively before

bending, with the initial bend and a completed single seam.

Referring to the drawings, 1 represents the stationary jaw of the tongs, 2 the movable jaw, and 3 the handle-sockets.

5 represents journal-boxes, of which there are three, which are secured to the bed-plate 6 of the stationary jaw by the screws or bolts 32. The journal-boxes project forward from the bed-plate, one at each end thereof and the other from the middle. These journal-boxes are provided with curved openings or recesses 7, of sufficient diameter to make peripheral bearings, in which the former or bending-bar 8 freely works. The said bending-bar, thus having three peripheral bearings relatively at the ends and the middle, is much more firmly held to its work than it could be with the usual pivot-bearings, which yield under the heavy stress of the bar in effecting the seam. The bar is also held much more firmly to its work than could be even a bar with peripheral bearings, that has not, as has this bar, a middle bearing that will not allow the bar to spring under the heavy pressure necessitated to effect the double-seam joints.

Metal-roofers are well aware of the difficulties arising from the springing of the jaw of the tongs and the bender-bar under the pressure of the double seam, especially when working over the cross-seams.

The initial section 9 of the bending-bar 8 is of nearly semi-cylindrical form in cross-section, and the whole length of said bar has an ogee working-face 10. It will be seen that the said ogee working-face of the bending-bar provides a curvilinear turn for the overlap at the apex 11 of the seam (see Fig. XV) that will not break the tin, as is a common occurrence with straight-faced bars, and also the out curve of the ogee face tightly nips the lower edge of the tin 12 of the overlap 13, so that, as stated, by avoiding breaks in the apex of the seam and effecting a tight joint beneath, that prevents the intrusion of moisture, a tight water-proof seam is provided.

The finishing-section 14 of the working-face of the bending-bar projects at about a right-angle line to the working-face of the initial section and to its own base, and there is a curvilinear change of face 15 from the initial section 9 of the bar, which is first brought into

action, and which only effects a right-angle bend of the overlap to that of the finishing-section 14, which completes the seam.

16 represents double right and left foot or twin treadles, whose attachment-shanks 17 connect the double treadle with the bending-bar, which they operate. These shanks and the treadles they attach are preferably cast integral with the bending-bar, which they relatively join on the right or left side of the handle-shanks which operate the jaws of the tongs. The said location of the shanks of the treadles keeps the bending-bar from longitudinal displacement.

18 represents a spiral reactionary spring, which is attached to the twin treadles by its terminal hook 19 and to a lug 20, that projects from the front side of the socket of the handle of the movable jaw, into the perforation 21 of which the terminal hook 22 of the spring is clasped.

The socket and shank for the attachment of the handle of the stationary jaw of the tongs is cast integral with the middle journal-box, and together they are secured to the bed-plate of the stationary jaw of the tongs, as stated, by screws 32. The handle will rise nearly vertically from said bed-plate.

The stationary jaw has the meeting edge of its horizontal base and its nearly-vertical face curved. It is found that this curved form for that part of the jaw which shapes the tin below the seam proper is much more favorable for a good seam, not breaking the tin, as is frequently the case when the lower edge is formed in a sharp right angle, and also with the like form of the movable jaw, forming a foot-brace to the seam that greatly strengthens it. Another advantage obtained by forming this curve in the lower part of the seam is that moisture does not lodge therein, as it does within a sharp angle, which we avoid in all parts of our seam. The tin in consequence at the usually most vulnerable points (from sharp angles, breakage, and rust) is alike durable with the rest of the roof.

The under side of the bed-plate, as well as the lower face of the movable jaw, is provided with three narrow projecting rest-slats 23, the jaws being thereby sufficiently elevated above the surface of the roof to allow room for the projection of the cross-seams, and thus the usual tilting of the tongs on said adverse surfaces and the consequent irregular seaming of the roof are avoided.

The socket 3 and swan-neck shank 33, that holds the handle of the movable jaw, is cast integral with said jaw and rises up vertically at first, and then curves backward over the bending-bar past the socket of the handle of the stationary jaw, in the rear of which it again rises nearly vertically to receive its handle.

The movable jaw, like the bending-bar, works on three bearings, so that the middle of the jaw cannot spring out under the heavy

pressure that it has to withstand. It is supported at each end by rock-arms 24, that are cast integral with it, the upper ends of which arms are provided with perforated bearings, through which the pivot-bolts 26 pass. The fixed ends of the bolts 26 are seated in perforations 27 in the two outer journal-boxes 5. A pivot-bolt 28, fixed in the middle journal-box 5, has loose bearings in the shank 33 of the handle of the movable jaw. It will be seen that the said pivot-bolts 26 and 28 in the journal-boxes are not only at a higher elevation than the bending-bar and the seams that said bar and jaw close, but are also placed at the forward ends of said journal-boxes, which is another very important feature in the results that said structure effects. The pivot-bearings of the movable jaw are thus brought much nearer the work, and the handle that operates this jaw has a largely-increased leverage.

The movable jaw is provided with a projection 34 on its finishing end, that clamps against the lower edge of the overlap of the finished seam, so as to provide a firm hold for the tongs to keep them from moving up away from the seam which is being formed. By this device, the tongs being held evenly to their work, perforce, a more even and in every way better seam can be effected. A curved recess 35 is provided in the finishing working-face 14 of the bending-bar to pass over the said projection 34. A recess 36 in the working-face of the movable jaw opposite the section 14 of the bending-bar permits the movement of said finishing-section of the bar.

The rear bottom corners of the bending-bar are provided at each end with a miter angular projection 41, which increases the peripheral bearing at each end of the bending-bar. The back of the stationary jaw has at each end an angular recess 42, that corresponds with the projection 41 to receive this projection when the bending-bar is moved back into its normal position.

It will be seen that the miter projections materially increase the extent of the available peripheral bearings of said bending-bar, and also, co-operating with the recesses 42 in the stationary jaw, hold said bar from longitudinal displacement.

An important advantage which is attained by the use of a movable jaw having bearings in the three journal-boxes is that as the operation of said jaw is preliminary to the operation of the bending-bar, and since the bearings of the movable jaw are placed forward of the peripheral bearings of the bending-bar, said bearings and the bending-bar are firmly held down by the leverage of the said jaw against the pressure of the material operated on. This is an important feature that is alone attainable through journal-boxes provided with rear peripheral bearings for the bending-bar and forward bearings for the operative jaw.

The operation of our roofing-tongs is as

follows: The adjacent roofing-plates 37 have their corresponding edges 38 flanged up at a right angle to the base of the plate, the margin of one plate rising a sufficient distance above the other to constitute an overlap 13, which is utilized to clinch down over the other edge, and thus form the initial seam preparatory to the second turn and clinch, which form the double seam of the tin or metal roof. The initial end 9 of the former or bending-bar is nearly semi-cylindrical in cross-section for about half the length of the bar, and this end bends down the overlap marginal edge 13 of the tin to about a right angle. The movable jaw 2 in the meantime holds the two flanged edges 38 of the sheet closely pressed together beneath the overlap margin 13. The tongs are then passed longitudinally along the seam and make another partial right-angle bend, and at the same time the curvilinear turn 15 of the working-face of the bending-bar and beyond it the finishing-section 14 of said bar make the final bend and finish up the seam, so that by moving the tongs along the seam and effecting a fresh clinch (the first section of the bending-bar turning down the overlap margin of the tin half-way and the second section completing the closure) the single seam is thus completed. As the seaming goes on the projection 34 at the finishing end of the movable jaw bears against the lower side of the pendent edge 12 of the seam already effected, and thereby holds the tongs and bending-bar evenly to their work. A much more regular seam is thus made than could otherwise be effected.

It will be seen that as the bearings of the movable jaw are placed forward and above the bending-bar and seam the jaw when moved to clamp the flanges 38 passes around the marginal edge of the tin and up to the clamping position, and again when the jaw is moved to release its hold it passes in a curvilinear direction downward and away from the seam, so that its forward journal-bearings prevent its coming into contact with the edge of the overlap tin.

It will be seen that when passing beneath the edge of the overlap, which is bent down at a right angle to the seam, the advancing edge of the movable jaw is at its lowest point, because at such time it is vertically beneath its center bearings. Therefore it passes without interference, and turning yet on its axis it describes the upward section of its arc, so as to fully grip the seam, and so, also, on its return it cannot drag the edge of the tin, for it is then moving in a curve downward.

The curvilinear turn between the initial section and the finishing-section of the bending-bar effects an even gradual change in the bend, so as to bring all the parts of the seam into line, and thus avoid the objectionable crooked and sometimes broken tin entailed by the abrupt change from the half-bend to the whole bend or finished seam. The bend-

ing-bar is actuated by twin treadles, which enable the operator to work to either the right or the left with either the right or left foot. 70

Roofers well know the danger encountered at the gable ends of roofs by having no optional change of treadle, as is provided by our twin treadles. The single treadle is all right for one end of the roof; but the very fact that makes it all right for that end makes it all wrong for the other, and the operator has to risk life and limb for lack of the twin treadles that our invention supplies. The twin treadles also enable the metal-roofer to do the seaming around chimneys with more ease and skill and to effect better work. 80

It will be seen that when the movable jaw grips the seam the reactionary spiral spring 18 is slackened by the forward movement of the handle that operates the jaw, so as to reduce to a minimum the adverse action of the spring, for the handle carries one end of said spring. So, also, on the return of the treadle after having formed the seam, the spring is again slackened by its reciprocal movement, in that the treadle and the handle of the movable jaw have a reciprocal movement that is always in unison, and thus, also, the spring is not put to so severe a strain as it would otherwise be. The spiral spring elevates the twin treadles, and through them withdraws the bending-bar whenever the operator's foot is removed from the treadles. The treadles are thus elevated ready for renewed action. The elevation of the bed-plate that carries the stationary jaw and of the movable jaw on rest-slats 23 overcomes the great difficulty experienced from the uneven seating of the tongs as they pass over the cross-seams that connect the tin plates. It is very difficult, if indeed possible, to form regular seams when there is an irregular rocking tilting movement of the tongs and their bending-bar. There is but a small space in the course of the tongs on the roof that is covered by the rests, and the remainder of the space is free for the occupancy of the cross-seams, so as not to interfere with the even seating of the tongs. 105 110 115

It will be seen, as stated in the description of the former or bender-bar, that, as it has given to it an ogee working-face, the tin is bent over at top with a slight curve that does not break or crack it, as is very frequently the case when, as heretofore, the overlap is bent down on a sharp angle by the straight working-face of the bender-bar heretofore used; also, the curve outward of the ogee just at the lower edge of the marginal overlap tin tightly presses it against its backing, so that there is no open joint for the admission of moisture to rust the tin, and the uneven irregular open joints at the lower edges of the overlaps are thus avoided. It will thus be seen that not only in the action of the bender-bar, but also of the tongs, our invention provides curvilinear instead of angular 120 125 130

turns. Thus at the foot of the seam it will be seen our tongs so form the foot of the joint or seam that it has a curved connection with no sharp angles to break or crack the tin, or on the surface of the roof to hold the moisture that rusts the metal; also, the curve of the adjacent sheets toward each other provides a brace to the seam that both makes it stronger to work on in seaming, and also stronger and more enduring afterward.

It will also be seen that since the grip-jaw of the tongs grasps the flange of the seam, and so steadies the bending-bar in its operation, as it is not removed from the seam until it reaches its farther extremity, there is provided in the handles of the tongs a grip to help to steady the operator, which is a feature of importance to the operator, whose footing is otherwise as uncertain as that on an inclined field of ice, whereas in tongs that do not give that support the operator is responsible for both holding the tongs from slipping and himself also, and many accidents have resulted therefrom. Again, it will be seen that the initial or forward section of the movable jaw, as it only grips the flanges beneath the initial section of the bending-bar, is never in the way of the half-bend, for the tongs are moved forward for the next initial step in the seaming before the full bend is effected, and there is in the finishing-section of said movable jaw a recess that allows room for the movement of the projecting finishing-section of the bending-bar.

Another advantage in beveling the heels of our grip-jaws is that the pressure of the jaw is especially applied at the upper edges of the seam, where the pressure is most required. To effect the second or double seam another set of tongs go over the course again, repeating the operation. The tongs and bending-bar then used are sufficiently less elevated above the plate on which they work, but are substantially the same device. With two operators and two pairs of tongs the joint can thus be double-seamed and finished up as they go.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. In roofing-tongs, the right and left foot-treadles secured to the bending-bar to enable the operator to work it from either the right or left, substantially as and for the purpose set forth.

2. In roofing-tongs, the combination of the angular projections 41 from the end lower corners of the bending-bar and the recesses in the stationary jaw of the tongs which receive said projections, substantially as and for the purpose set forth.

3. In roofing-tongs, the combination of the right and left foot-treadles and the reactionary spring connected to the treadles and the handle of the movable jaw to have a reciprocating movement in unison with both parts with which it connects, substantially as and for the purpose set forth.

4. In roofing-tongs, the combination of the three journal-boxes, each having peripheral bearings for the bending-bar, the three journals of the movable jaw, and the rest-slats secured to the bottom of the bed-plate of the stationary jaw and to the bottom of the movable jaw to raise them above the cross-seams, substantially as and for the purpose set forth.

5. In roofing-tongs, the combination of the three journal-boxes having the triple peripheral bearings for the bending-bar and the journals for the movable jaw, and the ogee working-face of the bending-bar which turns the overlap tin in a curve at the apex of the seam and tightly presses its under lip, substantially as and for the purpose set forth.

6. A roofing-tongs comprising a stationary jaw having three journal-boxes, each having a peripheral bearing for a bending-bar and a journal for a movable jaw above and in front of the peripheral bearing, a bending-bar supported in the peripheral bearings, and a movable jaw having a handle-shank and arms, pivoted upon the journals of the stationary jaw, substantially as and for the purpose set forth.

CHRISTIAN G. BLUM.
PHILIP LISTEMAN.

In presence of—

BENJN. A. KNIGHT,
JOS. WAHLE.