

Oct. 6, 1925.

C. W. SIEVERT

FLANGING MACHINE

Filed July 14, 1920

1,556,166

4 Sheets-Sheet 1

Fig. 1.

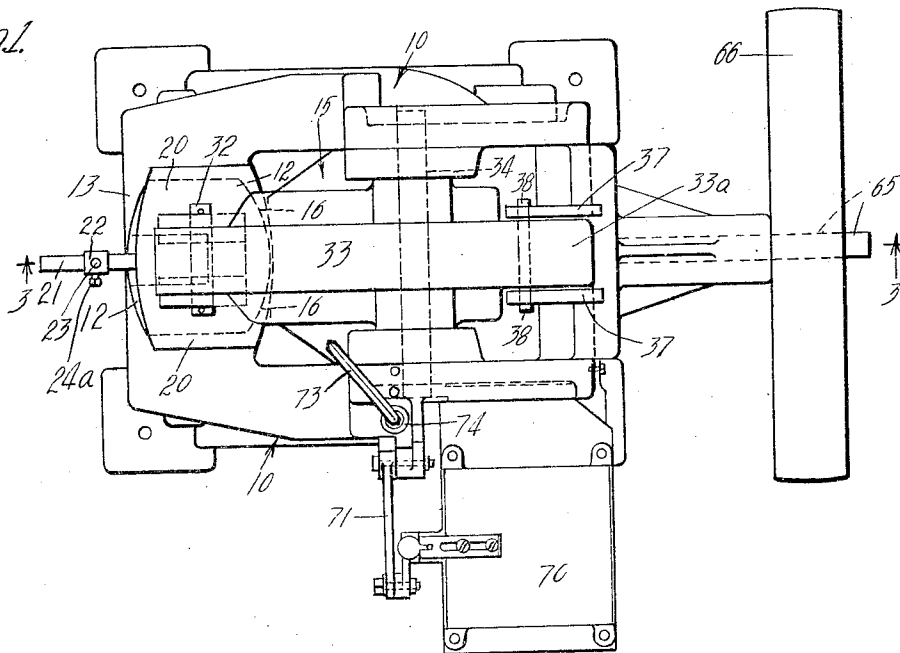
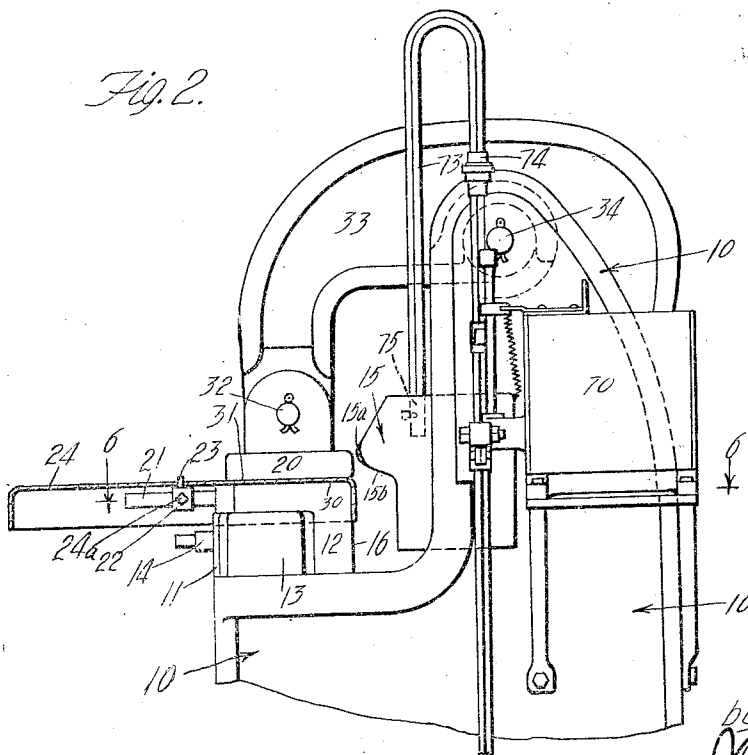


Fig. 2.



Inventor
Charles W. Sievert
by
James W. M. [Signature]
his Attorney.

Oct. 6, 1925.

1,556,166

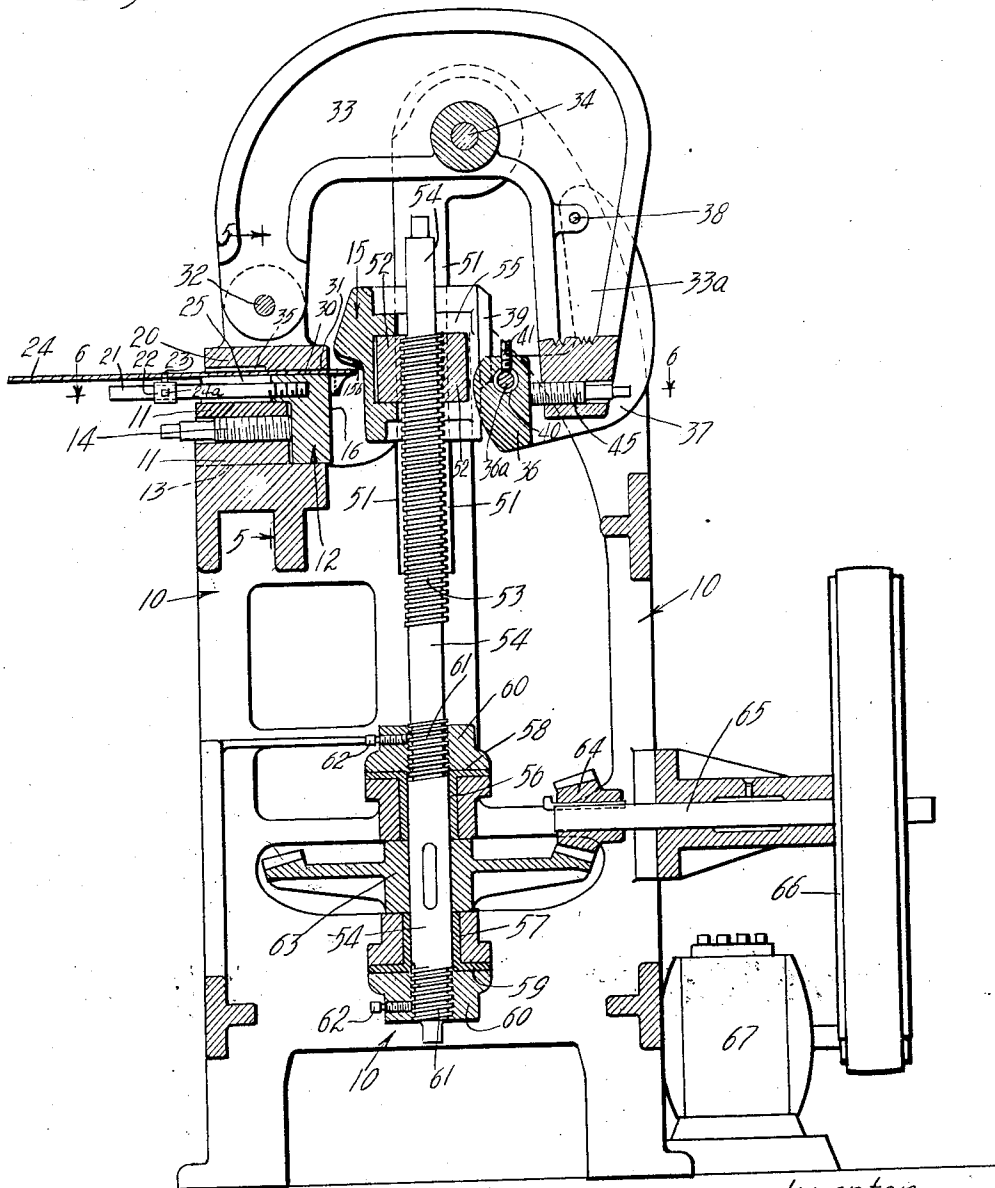
C. W. SIEVERT

FLANGING MACHINE

Filed July 14, 1920

4 Sheets-Sheet 2

Fig. 3.



Inventor
Charles W. Sievert

by *James T. Buckles*
his Attorney.

Oct. 6, 1925.

C. W. SIEVERT

FLANGING MACHINE

Filed July 14, 1920

4 Sheets-Sheet 3

1,556,166

Fig. 4.

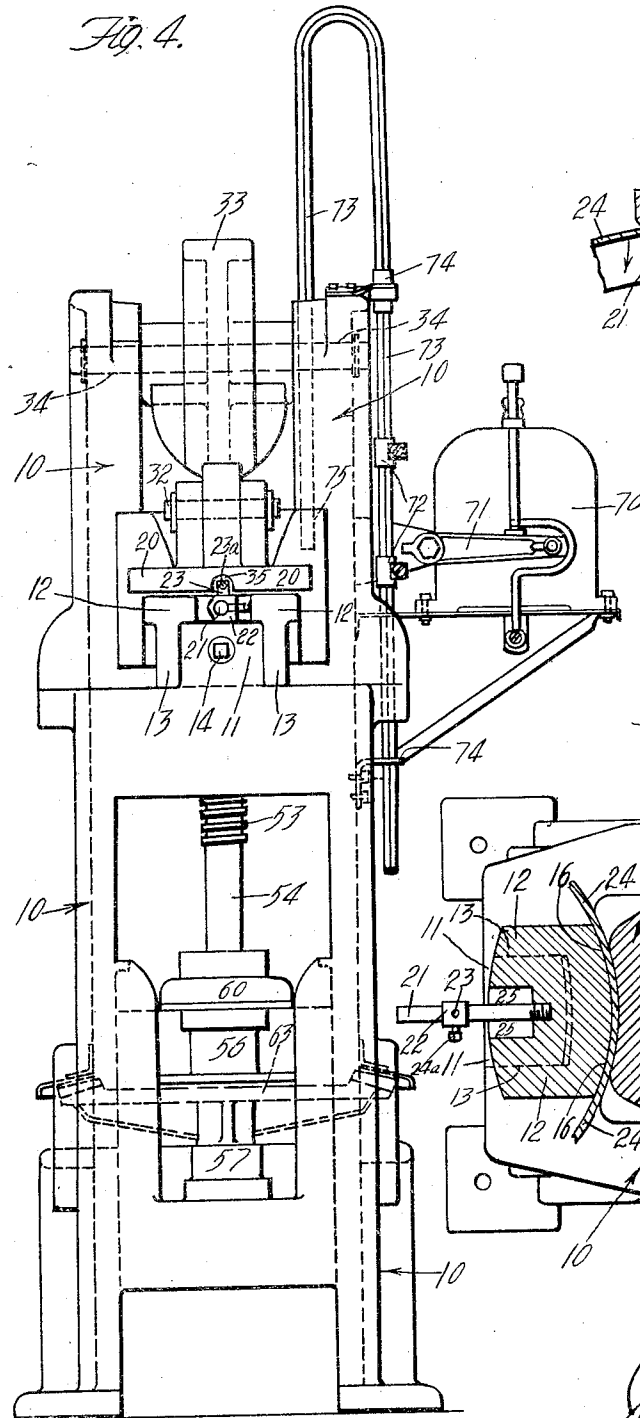


Fig. 5.

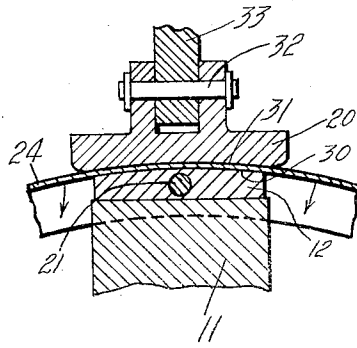
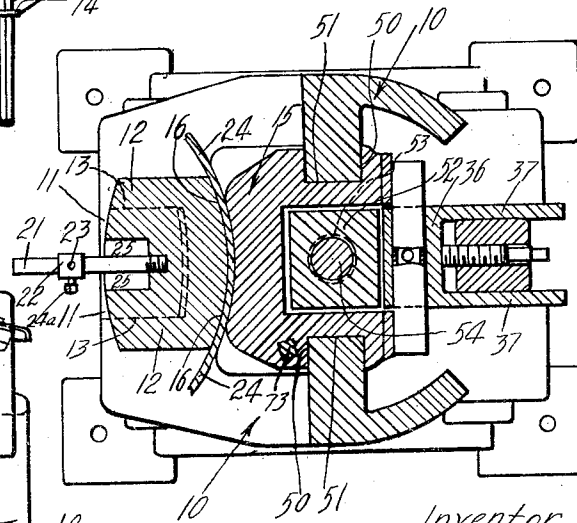


Fig. 6.



Inventor
Charles W. Sievert

by
James T. Bland
his Attorney.

Oct. 6, 1925.

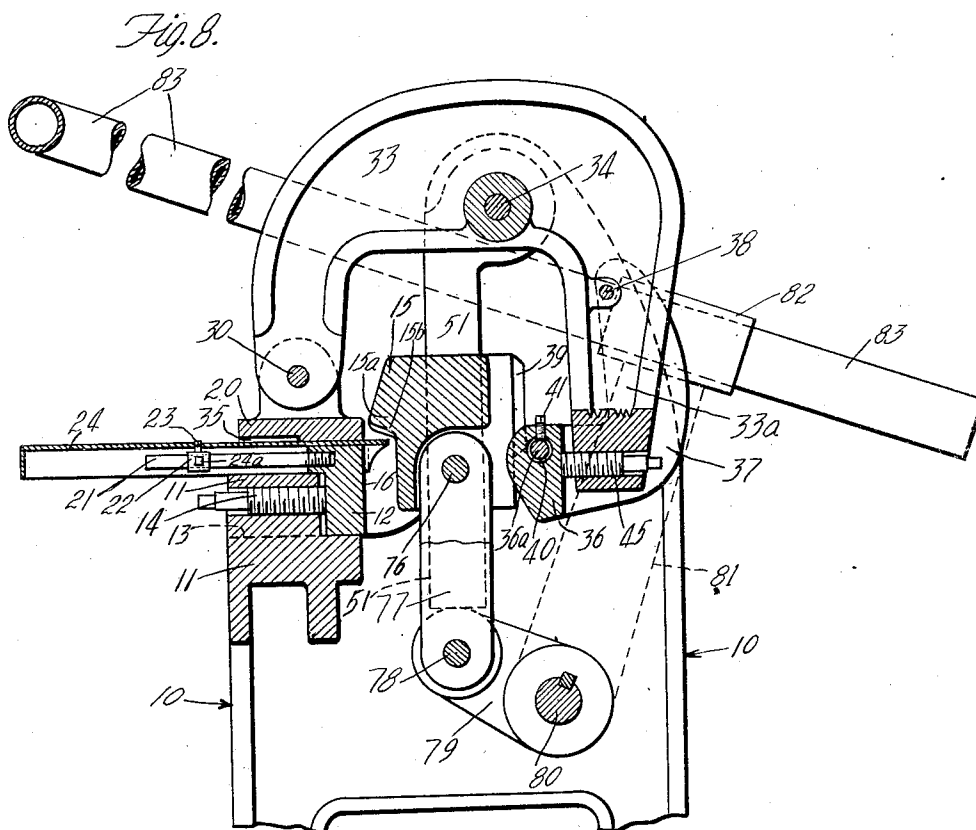
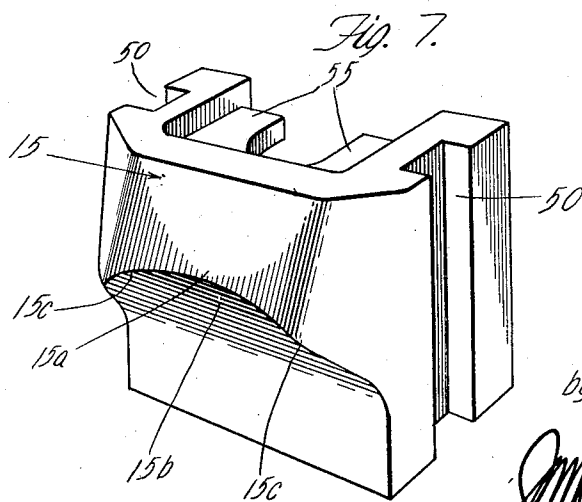
C. W. SIEVERT

FLANGING MACHINE

Filed July 14, 1920

1,556,166

4 Sheets-Sheet 4



Inventor
Charles W. Sievert
by

James T. Bucklew
his Attorney.

UNITED STATES PATENT OFFICE.

CHARLES W. SIEVERT, OF LOS ANGELES, CALIFORNIA.

FLANGING MACHINE.

Application filed July 14, 1920. Serial No. 396,107.

To all whom it may concern:

Be it known that I, CHARLES W. SIEVERT, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Flanging Machines, of which the following is a specification.

This invention relates to flanging machines adapted to turn or bend a flange upon sheet metal or the like. The usual, although not the exclusive, use of such flanging machines is for turning a circular flange on the edge of a circular plate; and for the reason that this is the most common use that such machines are put to, I illustrate and describe my invention as applying to that class of work; although it will be readily understood that the invention is not confined to that particular type of work.

The invention further relates to improvements in that general type of machine shown and described in my issued Patent Number 1,124,963, dated January 12, 1915; and a general object of the present invention is to provide an improved mechanism for a flanging machine of that general type; to provide certain improvements in the flange turning devices (hereinafter described); to provide a design and construction applicable to large machines for heavy work as well as to small machines for light work; and to provide a design and construction which may be utilized for power operation as well as for hand operation.

There are many particular objects of the invention and corresponding detailed features of the machine, and there are many detailed improvements. These will all be best understood, as also the broad features of the present invention, from the following detailed description of preferred and specific forms of mechanism embodying the invention. These preferred and specific forms of mechanism I illustrate and describe in detail, not for the purpose of limiting my invention to the particular details herein described, but for the purpose of giving a complete and clear understanding of the invention through a complete understanding of the details of specific forms thereof.

One of the features of change and improvement, as compared with the machine of my former patent, relates to the travel of the former. In my previous machine the

former has been pivoted and has traveled in a circular oscillating motion; whereas now I make the former travel preferably rectilinearly, guided by suitable ways on the frame of the machine. During the contact of the former with the sheet metal the latter is held down upon the anvil by a presser foot; and there is cooperating mechanism to cause the operation of the presser foot synchronously with the operation of the former. In a power operated machine the former is now preferably moved by a screw action; and means are provided for reversing the screw action to move the former back and forth. In a hand operated machine of the present type the former moves on ways; and operates the same as the former in the power operated type; but instead of being moved by screw action it is moved by hand operated lever action. Both types of machine are designed so that great power may be developed for the actuation of the former; so that very heavy plates may be quickly flanged. It is one of the features of the present machine that it is so designed and constructed as to be capable of applying heavy pressure for handling heavy work, and capable of amply withstanding the strain incident to such work; and, furthermore, subject to comparatively little wear in prolonged operation.

Another improvement in the present machine is in the shape of the former. This is made concave on its plate engaging face so that it assists the compression of the flange periphery to correspond to the reduced diameter of the turned flange. This is fully described hereinafter; and this improvement assists materially in the turning of flanges particularly on heavy plates.

For the purpose of describing in detail preferred forms of machines embodying the present invention I now refer to the accompanying drawings in which—

Figure 1 is a plan of the power operated type of machine; Fig. 2 is a side elevation of the upper part of said machine; Fig. 3 is a vertical central longitudinal section of the machine taken as indicated by line 3—3 on Fig. 1; Fig. 4 is a front elevation of the machine; Fig. 5 is an enlarged detailed section taken as indicated by line 5—5 on Fig. 3; Fig. 6 is a horizontal section taken as indicated by line 6—6 on Figs.

2 and 3, showing the machine with the former in its lower position while bending the flange on a plate; Fig. 7 is a perspective of the former; and Fig. 8 is a central vertical section of the upper part of the hand operated type of machine.

In the particular form of machine shown in the drawings the former is moved vertically; consequently the main frame 10 of the machine is an upstanding one. The particular design of this frame need not be specifically described, except as it provides bearings, guides and supports for the operating parts, as will be hereinafter noted. In the front and upper parts of the frame there is formed a heavy supporting block 11, upon which anvil 12 is supported. The anvil 12 is provided with side wings or flanges 13 which lie on opposite sides of block 11 and fit fairly snugly against the side surfaces of the block, so as to form guides to guide the anvil 12 true in its movement of adjustment into and out of the machine (to the right and to the left in Figs. 2 and 3). The anvil may be moved further into the machine by means of an adjusting screw 14. This screw is heavy and forms the abutment against which the anvil backs up solidly during the operation of the machine. In the section of the anvil shown in Fig. 3 it will be seen that the anvil is L-shaped and that its under surface rests directly upon the upper surface of block 11. The anvil is thus very solidly supported in the machine and is adjustable back and forth toward and away from the former 15. The front face 16 of the anvil is curved in plan, as is clearly shown in Figs. 1 and 6. This curvature may vary according to the diameter of the circular flange wished to be formed; and for this purpose the anvil is easily removable from the machine so that anvils with different front face curvatures may be substituted as desired. It will be noted that the anvil is not permanently fastened into the machine in any manner, only resting solidly upon block 11; and it may be lifted from the block when presser foot 20 is removed. The anvil carries an outwardly projecting rod 21 with an adjustable collar 22 thereon, the collar carrying a center pin 23 over which a central hole in the plate 24 may be placed, so that the plate may be swung around on its center as the flanging progresses. Collar 22 is adjustable upon rod 21 to suit different diameters of plates, and may be set in any given position by a set screw 24^a. The anvil is recessed at 25 so that collar 22 may be moved up into the recess to a position quite close to the curved forming face 16 of the anvil, to accommodate plates of small diameters.

The upper plate supporting surface 30 of the anvil is also curved in a direction transverse of the machine (that is, in a direction transverse of the plane of the drawing in

Fig. 3). This upper surface is convex, as is clearly shown in Fig. 5; and it is preferably, and for purposes of simplicity, made substantially of a cylindrical curvature. This curvature may be varied in different anvils; on anvils having a greater front face curvature at 16, and therefore adapted for plates of smaller diameters, the upper face curvature may be greater; while on anvils adapted for larger plates, or, more strictly speaking, for plates where the depth of flange to be turned is smaller in proportion to the radius of the plate, the upper face curvature may be comparatively smaller. The purposes and effects of this curvature will be later explained when the operation of the machine is explained in detail.

Presser foot 20 has its under face 31 curved to conform to the curvature of face 30 of the anvil; so that when the plate 24 is pressed down on the anvil by the presser foot it will be forced into the curved shape illustrated in Fig. 5. The presser foot 20 is pivotally mounted on a pin 32 on the forward end of an operating lever 33 which is pivotally mounted on horizontal pin 34 in the frame of the machine. This pivotal mounting of the foot allows it to adjust itself properly with reference to the upper curved face 30 of the anvil, so as to press the plate closely against the curved face of the anvil. The part of the presser foot over the anvil recess 25 is relieved as shown at 35 to allow center pin 23 to be moved close in on the smaller anvils for handling small circles.

Foot operating lever 33 has a depending arm 33^a which hangs down at the back part of the machine. This depending arm carries a member 36 having two arms 37 which pass on opposite sides of arm 33^a; and the member 36 is pivoted to lever 33 by the pivoting of the upper ends of these arms 37 at 38 to the arm 33^a. Member 36 carries a transverse roller 36^a which forms a rotating roller bearing for engaging the vertical cam plates 39 mounted on the back edges of former block 15. Roller 36^a may be kept from moving endwise by having a central groove 40 engaged by a screw 41. In the positions shown in the various views the downwardly moving cam plates 39 have just engaged roller 36^a and have moved the member 36 to the right in Fig. 3. Member 36 is adjustable upon the arm 33^a; an adjusting screw 45 forming the means of adjustment and forming an abutment against which member 36 presses back. Movement of member 36 to the right, caused by cam plates 39, will cause movement of arm 33^a to the right and will cause downward movement of presser foot 20, as will be apparent. Screw 45 is properly adjusted so that, when the cam plates 39 have acted to press member 36 to the right, the presser foot 20 is pressed

down solidly upon a plate of any given thickness, pressing that plate down tightly against the anvil, and holding it there in the curved configuration shown in Fig. 5. It will be noted that the cam plates 39 have vertical faces of some extent; so that, after the member 36 has once been pushed to the right by the downward motion of the former block 15, it will be held in that position to the right during a considerable downward movement of the former block—during the movement of the former block in which it is engaging the edge of plate 24.

Former block 15 is preferably shaped as illustrated in the various views, particularly in Fig. 7. It has on its opposite sides vertical grooves 50 adapted to engage vertical guide ribs 51 which are preferably formed integrally in frame 10. In the power operated type of machine the former block 15 is hollow and contains loosely a square nut 52 which runs upon the thread 53 of vertical screw shaft 54. The former block 15 is adapted to be accurately guided by the guide ways 51. Nut 52 is comparatively loose (in all horizontal directions) in the former block, the nut fitting in the recess in the back of the block and being confined between upper and lower ribs 55, so that the block must travel vertically with the nut. The nut fits the recess well enough, however, so that it cannot rotate with the screw. The upper end of screw shaft 54 preferably has no bearing, except the bearing that it has in the nut 52. The lower end, however, is provided with double radial bearings at 56 and 57 and double end thrust bearings at 58 and 59. These end thrust bearings may be adjusted by the adjustment of bearing collars 60 and screw threads 61 on the shaft, these collars being set in any desired position by the set screws 62. All end play may be easily taken up. Between the bearings 56 and 57 a bevel gear 63 is mounted on shaft 54; and a bevel driving pinion 64 meshes with gear 63. Pinion 64 is mounted upon the driving shaft 65; and this driving shaft may be driven in any suitable manner from any suitable source of supply. I may prefer to drive shaft 65 by belt connection with a suitable reversible motor, and for that purpose a belt pulley 66 is mounted upon shaft 65. The motor is illustrated at 67 in Fig. 3. It may be of any suitable type, but preferably a reversible motor, so that automatic reversing action of the machine may be controlled by properly switching the motor current.

I show a suitable arrangement for controlling the motor. At the side of the machine a standard reversing switch may be mounted, as indicated in Figs. 2 and 4 by the numeral 70. This reversing switch may be operated by an arm 71 which swings up and down, being shown in its lowermost position

in the drawings. In this position it is adapted to connect the motor in circuit to rotate the screw shaft 54 in such a direction as to feed the former block downwardly. The means for actuating arm 71 may comprise a pair of adjustable lugs 72 set upon a rod 73 (preferably a square rod, so that the lugs will not turn out of position). This rod moves vertically in suitable guide bearings 74. Its upper end is curved over and extends downwardly and is connected at 75 to the former block 15. The rod thus reciprocates vertically with the former block; and the adjustable lugs 72 are set in such positions as to throw the switch arm 71 when the former block reaches the upper and lower limits of its desired stroke. Connections are made between the switch 70 and motor 67 in any of the well known manners, and need not be described in detail here.

In Fig. 8 I show a modified form of mechanism adapted to be operated by hand. Here the former block 15 reciprocates vertically on the ways 51; and the former block is in all essentials the same as hereinbefore described, and has the same flange forming parts, as will be hereinafter described; excepting that the former block in Fig. 8 is not constructed to contain a nut 52 but is constructed to be connected by a pin 76 to a connection link 77. This connection link 77 connects with a pin 78 on the end of a short arm 79 mounted on the operating shaft 80. Shaft 80 is mounted transversely of the machine, and on the end of shaft 80 there are two arms 81 (only one of which is shown in Fig. 8). These arms have at their outer ends sockets 82 through which the operating handle 83 may slide. The operating handle projects out forwardly of the machine; and this operating handle may be made of pipe bent to a substantially U-shape, with the two long legs of the U extending through the two sockets 82. By sliding the handle 83 back and forth through the socket the leverage may be adjusted as desired. The leverage system in this hand operated mechanism is designed to give a very powerful operation of the former block; so that heavy plates may be flanged by hand power.

The front face of the former block 15 is shaped and constructed as is best shown in Figs. 3, 6 and 7. There is an overhanging nose 15^a below which the former block presents a downwardly facing surface 15^b. This surface 15^b is concaved downwardly as will be understood from an inspection of Figs. 3 and 7; so that the two outer edge points of this surface will first come into engagement with the sheet metal. The concavity of surface 15^b may be described as facing downwardly (facing in the direction of movement of the former onto the metal plate) and having a curvature that extends lengthwise of, or along, the edge of the

plate. The two points which first come into engagement with the sheet metal are indicated at 15° in Fig. 7. The nose 15^a is also concaved in a forward direction, as will be readily seen from Fig. 6; and this concavity may be made to correspond with the convexity of the surface 16 of the anvil. However, I find in practice that a concavity curvature of the former block may be used at considerably greater radius than the convexity curvature radius of the anvil, and good result be had. Consequently a former block with one curvature of concavity will suit for perhaps a number of anvils with different convexity curvatures.

The object of bending the plate of metal to the curvature shown in Fig. 5 is to tend to bring the metal of the edge of the flange, as the flange is formed, inwardly, as it comes downwardly, as is indicated by the two arrows in that figure. This operation tends to cause a linear compression of the metal of the flange around its edge; and by this means I find that I can successfully reduce the circumference of the edge of the flange to that appropriate to its reduced diameter. The metal of the plate is of course not bent beyond its limit of elasticity, so that it goes back to its flat position when the presser foot is raised off again. Now the downward concavity of the former block surface 15^b has to a certain extent the same effect. This concavity makes the former block, as it travels downwardly, push the metal of the flange into just such a curvature as is illustrated in Fig. 5 (although it may be more or less curvature). The result of this action also tends to linearly compress the metal of the flange so as to help reduce its circumference to correspond with the reduced diameter of the formed flange.

In operating the machine to form a flange around the circular plate, a circular plate is cut and is placed upon the machine with a central hole over pin 23. The pin is long enough to accommodate the thickest plate and at its upper end there may be a hole 23^a to receive a pin over the plate. The machine is then started in operation. As the former block starts down the presser foot 20 is first pressed down upon the sheet, bending it into a configuration such as is illustrated in Fig. 5. The former then moves on down against the sheet, which is then held tightly down upon the anvil, and the forming nose of the former comes into contact with the edge of the plate, turning the edge down by the kind of action hereinbefore described. This action, as stated, tends at all times, to draw the edge of the flange together, to decrease the periphery of the flange, as the flange is bent down. The flange may be bent clear down to its final shape by a single operation; or the travel of the former block may

be set so that the flange is first taken down, all around, to an intermediate position, and then on a second operation the travel may be set to be longer, so that the flange is taken clear down to its final position. When the flange is taken clear down to its final position it is to be noted that the anvil 12 is set up so that the nose of the former will wipe down over the metal of the flange as it is formed. The plate is turned by hand a small distance after each operation, and the formation of the flange proceeds around the plate as it is turned. Due to the drawing-in action on the edge of the flange, and the reduction of its peripheral length, as hereinbefore described, the bending down of one portion of the flange does not have any tendency to bulge out that portion which has been bent down immediately before.

Of course it will be understood that my machine is not necessarily limited to the formation of a flange at right angles to the plate. I have only illustrated a right angular formation because that formation is the most usual. However it will be readily seen that the angle between the upper plate supporting surface and the face surface 16 of the anvil may be made to suit any desired angle at which it is wished to form the flange. In any such case the travel of the former will preferably be parallel to the face 16, so that the former may wipe with heavy pressure over the metal of the flange as it is bent to its final position.

It is to be noted particularly that both forms of mechanism herein described are subject to very little wear and that they are so constructed as to amply take the strains imposed upon them. In the power operated form it is to be noted that the nut floats in the former block so that the screw shaft is free to take its own position as guided by its own bearing, without any friction or attending strain being put upon it. This also leaves the former block free to move up and down its guide-way, guided exclusively by it and bearing back against the guides to take the heavy strain that is imposed when the former is turning down and wiping the flange. None of the other parts are subjected at all to this heavy lateral thrust; except that, just to the extent that pressure is exerted on the presser foot, the former block bears back against member 36. The roller 36^a therefore assists in relieving the friction of movement of the former block. Furthermore, with such a construction, it is not necessary to finish the various parts, or to align them, as accurately as would be necessary if this floating construction were not used. These foregoing noted features are also true of the hand-operated type of machine. In the hand operated form of machine the operating parts are relatively strong and heavy and the only parts—the

pivot pins—which receive heavy pressure under friction, may be easily removed if they wear. In both forms of device it is to be noted that the former block is provided with long and broad bearing surfaces upon its guideways, so that the former block is solidly supported upon ways where little wear takes place.

Having thus described my invention, what I claim is:

1. In a flanging machine, an anvil and means to hold a plate with its edge to be flanged projecting beyond the anvil, and a former movably transversely of the plate onto its projecting edge part and past the plate supporting face of the anvil, the former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with the concavity facing in the direction of its movement onto the plate the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

2. In a flanging machine, an anvil and means to hold a plate with its edge to be flanged projecting beyond the anvil, and a former rectilinearly movable transversely of the plate onto its projecting edge part and past the plate supporting face of the anvil, the former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with the concavity facing in the direction of its movement onto the plate, the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

3. In a flanging machine, an anvil and means to hold a plate with its edge to be flanged projecting beyond the anvil and to bend the plate concavely toward the anvil on an axis transverse of the plate edge, and a former movably transversely of the plate onto its projecting edge part and past the plate supporting face of the anvil, the former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with the concavity facing in the direction of its movement onto the plate, the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

4. In a flanging machine, an anvil and means to hold a plate with its edge to be flanged projecting beyond the anvil and to bend the plate concavely toward the anvil on an axis transverse of the plate edge, and a former rectilinearly movable transversely of the plate onto its projecting edge part and past the plate supporting face of the anvil, the former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging

surface with the concavity facing in the direction of its movement onto the plate, the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

5. In a flanging machine, a frame, a plate carrying anvil thereon, a presser foot adapted to hold a plate on the anvil with its edge to be flanged projecting beyond the anvil edge, ways on the frame near the anvil and extending in a direction transverse to the plane of the plate held on the anvil, a former reciprocable on said ways past the edge of the anvil and adapted to engage and bend the edge of a plate held on the anvil, said former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with the concavity facing in its direction of movement toward the plate and the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

6. In a flanging machine, a frame, a plate carrying anvil thereon, a presser foot adapted to hold a plate on the anvil with its edge to be flanged projecting beyond the anvil edge, ways on the frame near the anvil and extending in a direction transverse to the plane of the plate held on the anvil, a former reciprocable on said ways past the anvil edge and adapted to engage and bend the edge of a plate held on the anvil, said former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with its concavity facing in the direction of movement toward the plate and the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described; the anvil and presser foot being curved so as to bend the plate between them concavely toward the anvil on an axis transverse of the said edge of the anvil.

7. In a flanging machine, a frame, a plate carrying anvil thereon, a presser foot adapted to hold a plate on the anvil with its edge to be flanged projecting beyond the anvil edge, ways on the frame near the anvil and extending in a direction transverse to the plane of the plate held on the anvil, a former reciprocable on said ways past the edge of the anvil and adapted to engage and bend the edge of a plate held on the anvil, said former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with its concavity facing in its direction of movement toward the plate and the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described; and the anvil and presser foot being curved so as

to bend the plate between them to a curvature on an axis transverse of the said anvil edge and with its concavity facing the anvil.

8. In a flanging machine, a frame, a plate carrying anvil thereon, a presser foot adapted to hold a plate on the anvil with its edge to be flanged projecting beyond the anvil edge, ways on the frame near the anvil and extending in a direction transverse to the plane of the plate held on the anvil, a former reciprocable on said ways past the anvil edge and adapted to engage and bend the edge of a plate held on the anvil, said former having a concave plate engaging surface with its concavity facing in its direction of movement toward the plate; and means to reciprocate the former on its ways embodying a screw shaft substantially parallel to the ways, and the former carrying a floating nut engaging the screw shaft.

9. In a flanging machine, a frame, a plate carrying anvil thereon, a presser foot adapted to hold a plate on the anvil with its edge to be flanged projecting beyond the anvil edge, ways on the frame near the anvil and extending in a direction transverse to the plane of the plate held on the anvil, a former reciprocable on said ways past the anvil edge and adapted to engage and bend the edge of a plate held on the anvil, said former having on its forward face that first engages the plate and passes the anvil surface a concave plate engaging surface with its concavity facing in its direction of movement toward the plate and the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described; and the anvil and presser foot being curved so as to bend the plate between them to a curvature on an axis transverse of the said anvil edge; and means to reciprocate the former on its ways embodying a screw shaft substantially parallel to the ways, and the former carrying a floating nut engaging the screw shaft.

10. In a flanging machine, a frame, a plate carrying anvil thereon having an upper plate supporting surface and a side surface against which the edge of the plate may be bent back to form a flange, means to hold a plate on the anvil in a position projecting beyond said side surface, ways on the frame parallel to the flanging surface of the anvil, a former reciprocable on the ways and adapted to engage the edge of a plate on the anvil and bend the edge to form a flange and adapted by its movement on the ways parallel to the flanging surface of the anvil to wipe over the whole surface to the formed flange; the plate supporting face of the anvil being convexed on an axis transverse of the said anvil side surface and the convexity facing the direction from which the former approaches the anvil in its flange

bending movement, and the former having on its forward surface that first engages the plate a concave plate engaging surface with its concavity facing in the direction of its flange bending movement and the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

11. In a flanging machine, a frame, a plate-carrying anvil thereon having an upper plate supporting surface and a side surface against which the edge of the plate may be bent back to form a flange, means to hold the plate on the anvil, ways on the frame parallel to the flanging surface of the anvil, a former reciprocable on the ways and adapted to engage the edge of a plate on the anvil and bend the edge to form a flange and adapted by its movement on the ways parallel to the flanging surface of the anvil to wipe over the whole surface of the formed flange; and means for reciprocating the former on the ways, said means embodying moving mechanism loosely connected to the former to move it on and be guided by the ways, said ways taking the lateral thrust of the former as it presses laterally against the flange.

12. In a flanging machine, a frame, a plate-carrying anvil thereon having an upper plate-supporting surface and a side surface against which the edge of the plate may be bent back to form a flange, means to hold a plate on the anvil, ways on the frame parallel to the flanging surface of the anvil, a former reciprocable on the ways and adapted to engage the edge of a plate on the anvil and bend the edge to form a flange and adapted by its movement on the ways parallel to the flanging surface of the anvil to wipe over the whole surface to the formed flange; and means for reciprocating the former on the ways embodying a screw shaft parallel to the ways and a cooperating nut floatingly carried by the former, the floating nut having lateral freedom relative to the former so that the former is entirely free to be guided by the ways alone and so that the ways take the lateral thrust of the former as it presses laterally against the flange.

13. In a flanging machine, means to hold a plate in a curvature about an axis parallel to the plate and transverse of its edge to be flanged, and a flanging former movable onto the edge portion of the plate in a direction transversely of the plate and from that side of the plate that is held convex toward that side of the plate that is held concave, said former having on its forward surface that first engages the plate a concave plate engaging surface with its concavity facing in the direction of movement of the former onto the plate and the curva-

ture of said concavity extending along the edge of the anvil over which the plate projects, substantially as described.

14. In a flanging machine, means to hold
5 a plate in a curvature about an axis parallel to the plate and transverse of its edge to be flanged, and a flanging former movable onto the edge portion of the plate in a direction transversely of the plate and from
10 that side of the plate that is held convex toward that side of the plate that is held concave, said former having on its forward surface that first engages the plate a concave engaging surface with its concavity
15 facing in the direction of movement of the former onto the plate and the curvature of said concavity extending along the edge of the anvil over which the plate projects, substantially as described and the former also
20 having a concave face that wipes the form-

ed flange, the axis of said last-mentioned concavity being substantially parallel to the direction of movement of the former.

15. In a flanging machine, means to hold
25 a plate with its edge to be flanged projecting beyond the holding means, and a former movable transversely of the plate onto its projecting edge part and past the plane of the plate, the former having on its face toward the holding means a plate engaging
30 surface concave about an axis parallel to the direction of movement of the former and having on its forward face that first engages the plate a plate engaging surface
35 concave whose curvature extends along the edge of the plate substantially as described.

In witness that I claim the foregoing I have hereunto subscribed my name this 30th day of June, 1920.

CHARLES W. SIEVERT.