

L. B. KAUFFMANN.
METAL SHAPING MACHINE.
APPLICATION FILED NOV. 17, 1909.

1,015,324.

Patented Jan. 23, 1912.
3 SHEETS—SHEET 1.

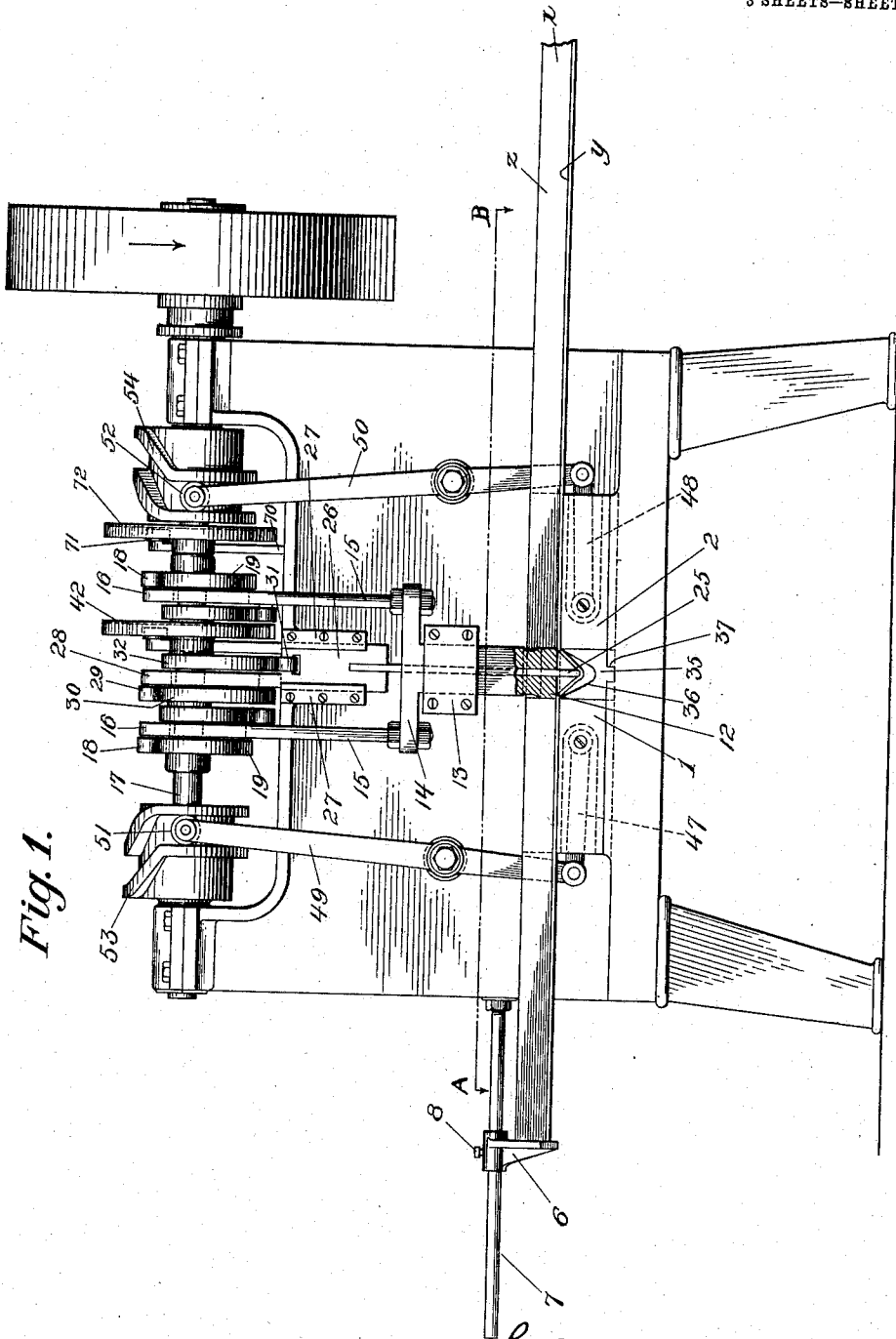


Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

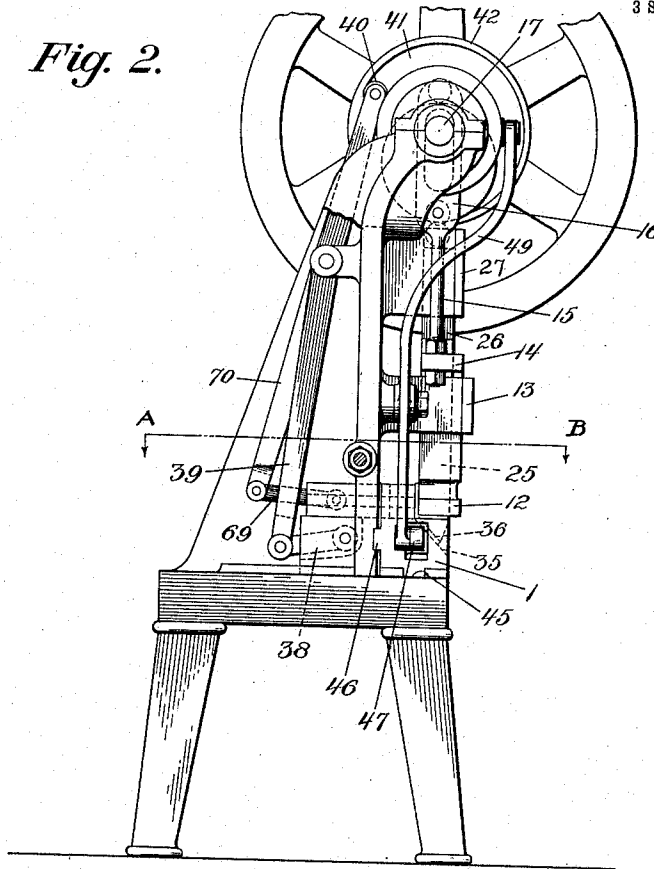
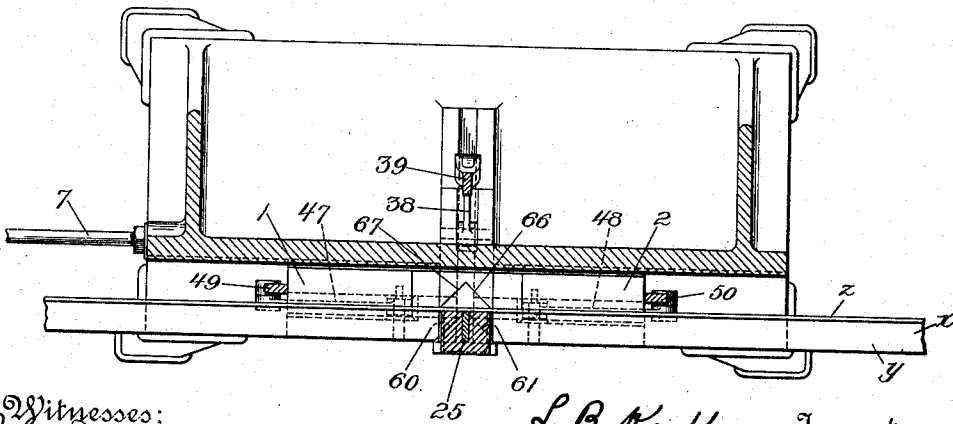


Fig. 3.



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Fig. 4.

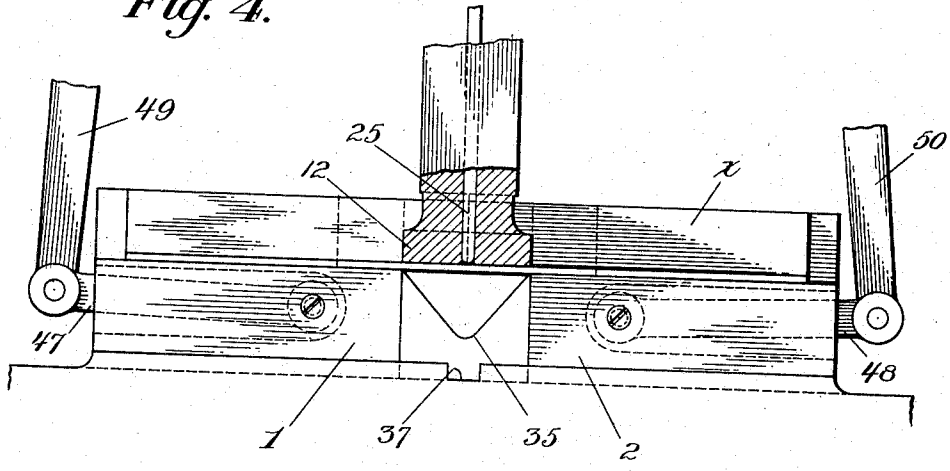


Fig. 5.

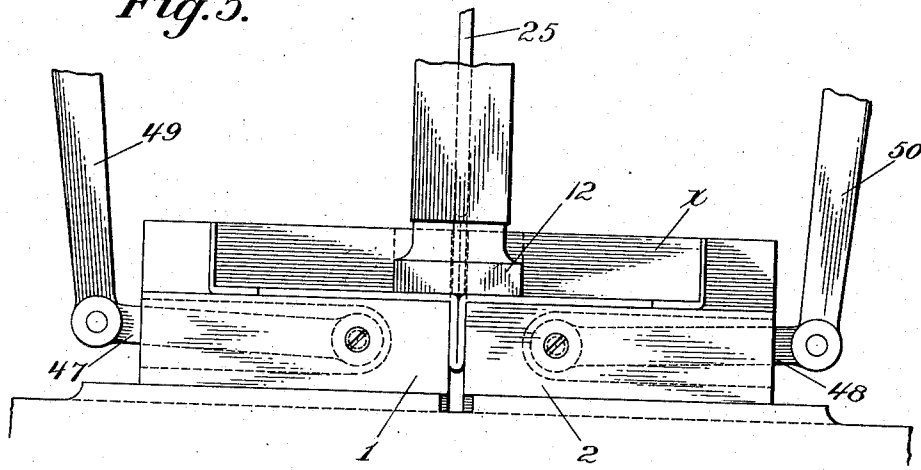
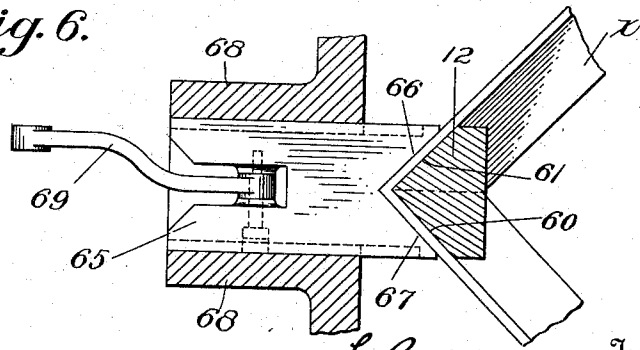


Fig. 6.



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UNITED STATES PATENT OFFICE.

LOU B. KAUFFMANN, OF NEW YORK, N. Y., ASSIGNOR TO KAUFFMANN KASE KOM-
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METAL-SHAPING MACHINE.

1,015,324.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed November 17, 1909. Serial No. 528,590.

To all whom it may concern:

Be it known that I, LOU B. KAUFFMANN, a citizen of the United States, residing in New York city, in the county of New York and State of New York, have invented new and useful Improvements in Metal-Shaping Machines, of which the following is a specification.

The invention relates to machines for shaping metal and more particularly to machines for shaping metal strips into angles and frames.

In certain aspects of the invention it relates more especially to machines for forming a double angled frame without cutting away the metal, that is, a frame with one bend, usually at a right angle, running lengthwise of the strip of metal, and a bend in both of these two angled parts transversely of the strip, and in the plane of one of said angled parts and transversely to the plane of the other.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and forming a part hereof, illustrate one embodiment of the invention, the same serving in connection with the description herein to explain the principles of the invention.

Of the drawings: Figure 1 is a front elevation of a machine constructed in accordance with the principles of the invention; Fig. 2 is a side elevation looking at Fig. 1 from the left; Fig. 3 is a sectional plan on the line A—B of Figs. 1 and 2, but omitting some parts for clearness; Fig. 4 is a fragmentary view of certain of the parts before the bending of the blank is begun; Fig. 5 is a view of the same parts shown in Fig. 4 but showing the closing together of the bend shown in Fig. 1; and Fig. 6 is a plan corresponding to parts of Fig. 5.

Referring by way of example to the accompanying drawings, which illustrate one embodiment of the invention, a machine is shown adapted to receive the sheet or strip of metal to be formed up into an angle or angled frame. Said machine is further shown constructed to receive either a plane sheet strip, or an angled sheet or an angled strip.

In the drawings the machine is shown operating upon a strip α bent longitudinally thereof throughout at a right angle, thus constituting two parts at right angles to each other.

The sheet or strip α is shown supported on the members 1 and 2, which are shaped to support both parts of the strip in proper position with respect to the machine parts, although so far as concerns many features of the invention the strip might be supported on the machine frame. The members 1 and 2 perform other functions which will be described hereinafter. There are also provided suitable means for positioning the strip lengthwise, the embodied form thereof comprising a gage 6 shown slidably adjustable upon the support 7 and having a clamping screw 8 or other suitable fastening device.

Suitable means are provided by the invention for holding the strip in position to be operated on, and in the illustrated form thereof a member 12 is shown movable into and out of contact with the strip. Said member 12 is shown slidable in guides 13 carried by the machine frame and having a suitable cross head 14, and connected to said cross head are the rods 15. Said rods are shown provided at their farther ends with yokes 16, which embrace a shaft 17. The yokes 16 are shown with friction rolls 18 cooperating with cams 19 upon the shaft 17.

Suitable means are provided for forming a bend in the strip to form into two parts at an angle to each other. In this embodiment the bend is formed in one of the parts of the strip in order to so bend the entire strip. A form of such means shown herein is further adapted to form a bend beginning at or contiguous to the longitudinal bend in the strip heretofore described and then deepening outwardly to the edge of the strip, so that when this bend is closed together the entire strip may thereby be bent around at an angle. The embodied form of such means comprises a plunger 25 shown conveniently as working within the member 12 and serving to bend the strip α down into the members 1 and 2. The plunger 25 is shown fixed to a slide 26 working in the guides 27 upon the machine frame. Fixed to the slide 26 is shown a yoke 28 embracing the shaft 17 and provided with a roller 29 with which cooperates

a cam 30 upon the shaft 17. Another roller 31 is shown mounted upon the slide 26 and cooperating with a cam 32 upon the shaft 17.

So far as concerns certain features of the invention, the mechanism just described may be relied on to make the bend in the part y of the strip x . According to other features of the invention, however, a forming die is provided to cooperate with the plunger or former 25. In the illustrated embodiment a suitable die block 35 is shown provided with a hollowed out portion 36 which is shown as beginning on the face of the block and increasing in depth toward an end thereof in order to form a bend in the metal in the manner already described, and as shown most clearly in Fig. 2 of the drawings. The block 35 is shown located between the members 1 and 2 which are separated from each other a distance corresponding substantially to the width of the bend to be made in the metal. The block 35 is shown reciprocable in a guide 37 in the machine frame to move out of the way of blocks 1 and 2 during the operation of closing or folding the bend in the metal upon itself. Suitable actuating means for reciprocating the block are provided and the illustrated form thereof comprises a link 38 pivoted to said block 35 and to a lever 39 pivotally mounted on the machine frame. The other end of said lever is shown provided with a roller 40 working in groove 41 of the cam 42 carried by the shaft 17.

There is provided by one feature of the invention means for closing together the bend made in the metal strip, and in the illustrated form of such means the members 1 and 2 are utilized as closing jaws or blocks. Said members are shown slidably mounted in a groove 45 and a groove 46 in the machine frame. Suitable actuating and controlling means for these closing jaws are provided, the illustrated form thereof comprising pivoted links 47 and 48 connecting the blocks 1 and 2, respectively, with levers 49 and 50. Said levers are shown with their other ends provided with rollers 51 and 52 working in the groove cams 53 and 54 fixed on the shaft 17.

In accordance with one feature of the invention means are provided for forming or truing the angle formed by the bending of the strip. In the illustrated form thereof the member 12 is shown provided with inclined faces 60 and 61 inclined to each other at the angle to which the strip is to be bent. In the drawing this is shown as a right angle. Cooperating with said faces 60 and 61 is shown a forming block 65 having correspondingly inclined faces 66 and 67 which serve to press the part z of the strip firmly against the faces 60 and 61 in order to set the corner and prevent either back springing or deformation. The block 65 is shown recip-

rocable in grooves or guides 68 in the machine frame. The block 65 is actuated in a suitable manner, as through a link 69 pivoted thereto and to a lever 70, which lever is pivotally carried on the machine frame. Said lever 70 is shown provided with a roller 71 in operative relation with a suitable cam 72 on the shaft 17.

Suitable power communicating devices will of course be provided, but are not shown or described in detail herein, as they fall within the province of mechanical skill.

The manner of operation of the mechanism described and shown is substantially as follows: The strip x is placed in position in the machine and may be longitudinally positioned against the gage 6. The member 12 is then brought down lightly upon the strip x so as to prevent it buckling or moving out of position while at the same time permitting the two parts of the strip to move as the new angle is formed in the strip (see Fig. 4). When the strip is thus in position the die block 35 is between the closing blocks 1 and 2, and the former 25 is moved downwardly, as shown in Fig. 1, to bend the metal between the edges of the blocks 1 and 2 and form the angle between the parts y and z of the strip x in a direction deepening outwardly to the edge of the strip. The two ends of the strip x will swing around to a corresponding degree, thereby forming the new angle in the whole strip. The die block 35 is then withdrawn and the closing blocks 1 and 2 move toward each other to close up the bend in the metal as shown in Fig. 5 of the drawings. The forming block 65 presses with the faces 66 and 67 against the back of the part z of the strip x pressing against the surfaces 60 and 61 of the member 12 (see Fig. 6). The member 12 is then raised, and the strip x may be either removed or moved to a new position for a second operation thereon. When a frame is to be formed the successive angles may be made in a strip x until the ends of the strip are brought together, when they may be welded.

From all the foregoing it will be understood that a machine has been provided realizing the objects of invention and the advantages herein set forth, together with other objects and advantages.

The invention, in its broader aspects, is not limited to the particular constructions shown, nor to any particular constructions by which it has been or may be carried into effect, as many changes may be made in the construction without departing from the main principles of the invention and without sacrificing its chief advantages.

What I do claim as my invention and desire to secure by Letters Patent is:—

1. A metal forming machine including in combination means for positioning a strip

of metal bent longitudinally into two parts at substantially right angles to each other, a reciprocable die block movable into and out of operative relation with one of the parts of said strip, said die block being hollowed from said longitudinal bend between the parts of said strip with increasing depth outwardly to the edge of said part of said strip, a reciprocable former for bending said part into the hollow of the die block, said bend beginning adjacent to said longitudinal fold and deepening outwardly to the edge of the strip, a pair of reciprocable blocks at either side of said die block for closing said bend upon itself, means for moving said die block out of operative relation with the strip after the bend is formed, means for moving said reciprocable blocks together to close said bent portion upon itself, and means for engaging said strip at the point of formation of said bend and causing it to form substantially a right angle at the point of bend when the bend is closed upon itself by said blocks.

2. A metal forming machine including in combination means for positioning a strip of metal bent longitudinally into two parts at right angles to each other, an engaging member movable into engagement with one of said parts of said strip, said member having a right angled part presenting its edge to said other part of said strip, a die block movable into position on the opposite face of the strip from said member, said die block being hollowed from a point opposite said angled portion with increasing depth outwardly to the edge of said strip, a former for bending said part of the strip into the hollow of the die block with a depth increasing from said longitudinal bend outwardly to the edge of the strip, means for withdrawing the die block from operative relation with the strip, and means for closing said bend together upon itself whereby the entire strip is bent at a right angle, and the other part of the strip is bent about the right angled part of said engaging member.

3. A metal forming machine for operating upon a strip of metal bent longitudinally throughout its length including in combination a movable member which contacts with a surface of one of said bent parts of the strip and having an angle against the other of said bent parts, a movable former working within said member and operating upon said first mentioned bent part, a movable die block on the opposite side of said bent part from the former to cooperate with the former in bending said part and a pair of movable closing blocks for closing said bend upon itself.

4. A metal forming machine for operating upon a strip of metal bent longitudinally throughout its length including in combination a reciprocating member which

contacts with a surface of one of said bent parts of the strip and having an angle against the other of said bent parts, a reciprocating former working within said member and operating upon said first mentioned bent part, a reciprocating die block on the opposite side of said bent part from the former to cooperate with the former in bending said part, and a pair of reciprocating closing blocks for closing said bend upon itself.

5. A metal forming machine for operating upon a strip of metal bent longitudinally throughout its length including in combination a movable member which contacts with a surface of one of said bent parts of the strip and having an angle against the other of said bent parts, a movable former operating upon said first mentioned bent part, a movable die block on the opposite side of said bent part from the former to cooperate with the former in bending said part and a pair of movable closing blocks for closing said bend upon itself.

6. A machine for operating upon a strip of metal including in combination a movable member which contacts with one face of the strip, a movable former working within said member, a movable die block on the opposite face of said strip from said former to cooperate with said former in making a bend in said strip, and a pair of movable closing blocks for closing said bend upon itself.

7. A machine for operating upon a strip of metal including in combination a reciprocating member which contacts with one face of the strip, a reciprocating former working within said member, a reciprocating die block on the opposite face of said strip from said former to cooperate with said former in making a bend in said strip, and a pair of reciprocating closing blocks for closing said bend upon itself.

8. A machine for operating upon a strip of metal including in combination a movable member which contacts with one face of the strip, a movable former, a movable die block on the opposite face of said strip from said former to cooperate with said former in making a bend in said strip, and a pair of movable closing blocks for closing said bend upon itself.

9. A metal forming machine including in combination a pair of reciprocating closing blocks upon which the strip rests, a die block reciprocable between and away from said closing blocks, a former on the opposite side of the strip and cooperating with said die block to bend the strip, and means for causing the closing blocks to move together to close or fold said bend upon itself after the die block has moved away from between said closing blocks.

10. A metal forming machine including

in combination a reciprocating die block, a former for bending a sheet of metal thereinto, and two closing blocks reciprocable across the path of the die block for closing
5 said bend upon itself.

11. A metal forming machine including in combination means for positioning a metal strip folded longitudinally into two parts at right angles to each other, a die
10 block movable into and out of position with reference to one of said parts, a movable member for forming the metal of said part into the die, means for withdrawing said die block, and movable means for engaging
15 said shaped or formed part and pressing or folding it together upon itself.

12. A metal forming machine including in combination a die block, a former for bending a sheet of metal thereinto, means
20 for removing the die block, a member mov-

able into the place previously occupied by the die block and a member cooperating therewith to fold or close the bend upon itself.

13. A metal forming machine including 25 in combination a former engaging said strip on one face thereof to bend the strip, a die block movable into and out of position on the opposite face thereof to cooperate with said former, and movable closing
30 blocks for engaging the bend made by the former and its die block to close said bend upon itself.

In testimony whereof, I have signed my name to this specification, in the presence
35 of two subscribing witnesses.

LOU B. KAUFFMANN.

Witnesses:

JOHN D. MORGAN,
ROSE MENK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."