No. 839,951. PATENTED JAN. 1, 1907.

R. D. PATTERSON.

METAL BENDING MACHINE.

APPLICATION FILED MAY 29, 1906.

2 SHEETS--SHEET 1.

Fig. 1.

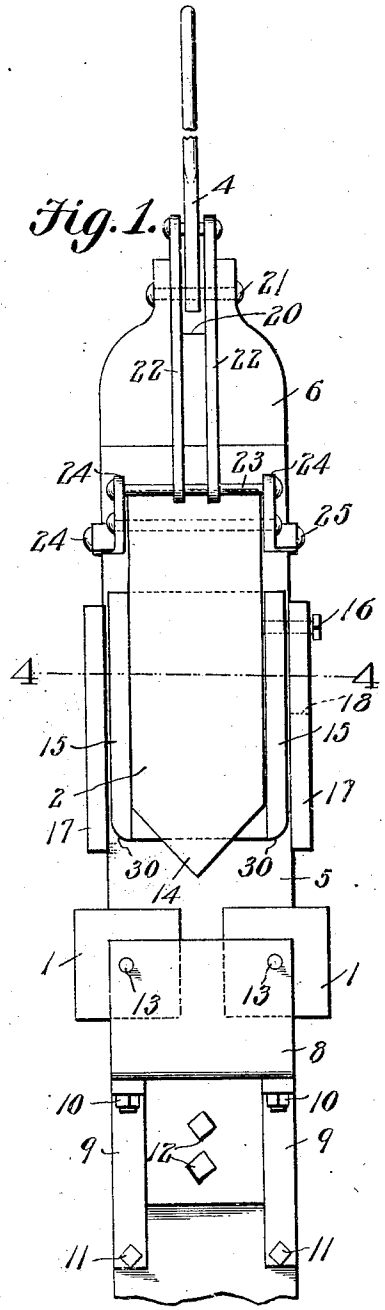
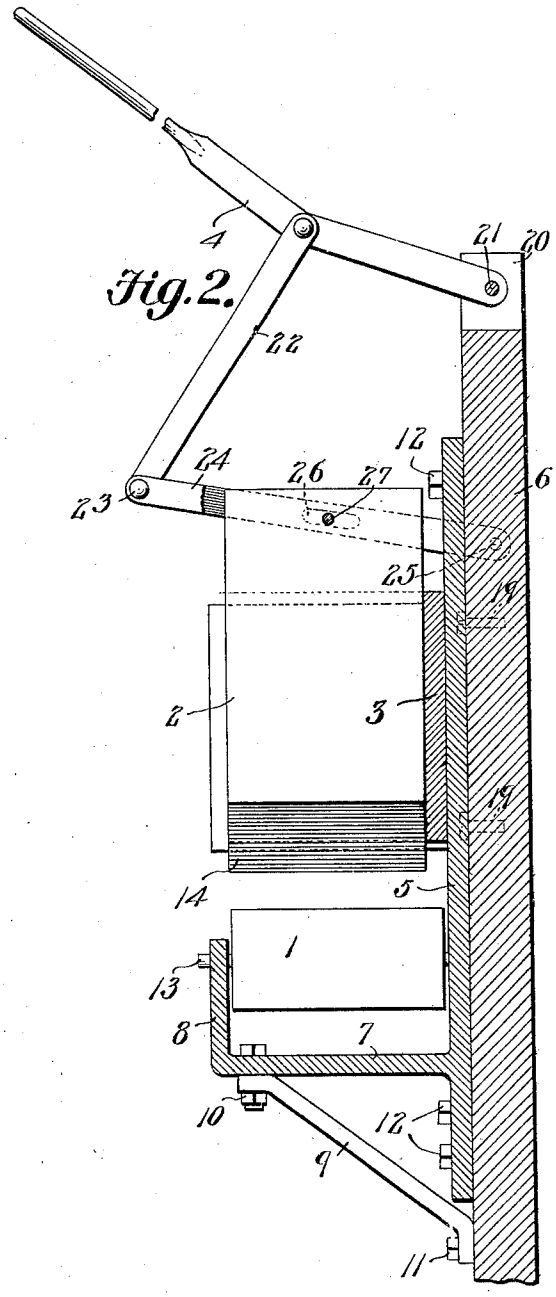


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

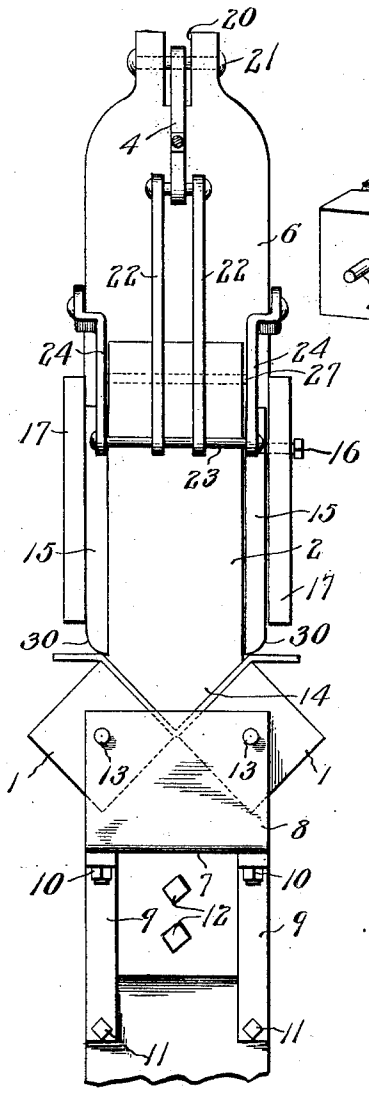


Fig. 5.

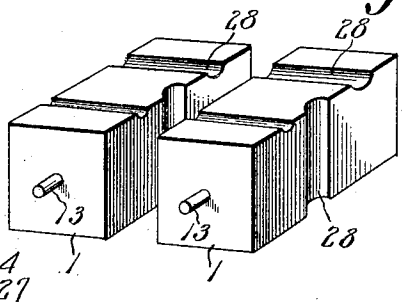


Fig. 6.

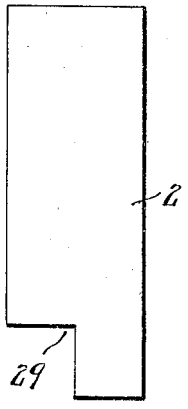
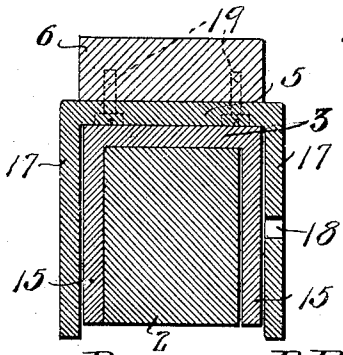


Fig. 4.



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UNITED STATES PATENT OFFICE.

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METAL-BENDING MACHINE.

No. 839,951. Specification of Letters Patent. Patented Jan. 1, 1907.

Application filed May 29, 1906. Serial No. 319,338.

To all whom it may concern:

Be it known that I, RANSOM D. PATTERSON, a citizen of the United States, residing at Fort Smith, in the county of Sebastian and State of Arkansas, have invented a new and useful Metal-Bending Machine, of which the following is a specification.

This invention relates to metal-bending machines.

The object of the invention is to provide a novel form of mechanism which will in a rapid and thoroughly practical manner secure angular bending of metal either in the form of square, rectangular, or round bars to any angle and while in a cold state.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a metal-bending machine, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is a view in front elevation exhibiting the position of the parts of the machine when at rest. Fig. 2 is a view in side elevation, partly in section. Fig. 3 is a view in front elevation exhibiting the position of the parts of the machine when in operation. Fig. 4 is a horizontal sectional view taken on the line 4 4, Fig. 1. Fig. 5 is a perspective detail view of a pair of rollers adapted for bending round or semicircular bars of metal. Fig. 6 is a detail view of a slightly-modified form of plunger that may be employed in lieu of that shown in Fig. 1.

The machine constituting the present invention comprises a pair of polygonal formers or rollers 1, a reciprocatory plunger or follow-block 2, a gage 3, with which the plunger is adjustably connected, a plunger-actuating lever designated generally 4, a frame 5, and a support 6. The frame 5 is constructed of metal and may be of cast-iron and is provided near its lower end with a bracket 7, having an upturned flange 8, the bracket being held against yielding downwardly by braces 9, which are bolted to the under side of the bracket and to the support, respectively, as shown at 10 and 11, the frame being held combined with the support by bolts 12. The formers 1 are polygonal in cross-section, in this instance quadrangular, and are provided at their opposite ends with pintles or trunnions 13, that engage suitable bearings in the flange 8 and in the frame. These rollers are so journaled relatively to each other that when their diagonals are in alinement, as shown in Fig. 3, the opposed corners will just pass each other, thereby to secure a sharp bend of the metal and to obviate any danger of cracking.

The plunger or follow-block may be made either of a solid piece of metal or a plurality of pieces suitably combined and, as shown in Figs. 1, 2, and 3, is provided with an apex form or angular lower terminal 14, the pitch of the sides of which coincide with the angular disposition of the dies of the formers when the diagonals of the latter are in alinement, as shown in Fig. 3. This plunger is mounted between the side flanges 15 of the gage and is held adjustably combined therewith by a pointed bolt 16, which passes through one of the flanges and bites into the metal of the plunger. The gage works between a pair of forwardly-projecting guide-flanges 17, carried by the frame, and are either integral therewith or secured thereto, and thus secures vertical guiding of the parts. In order to permit the proper vertical range of movement of the plunger and gage relatively to each other to cause them properly to coact with the former, one of the guide-flanges 17 is provided with a vertical slot or recess 18, (shown in Fig. 4,) in which the shank of the bolt 16 will work as the parts are reciprocated. The guide-flanges 17 are formed integral with the frame 5 to produce an open-sided rectangular structure secured to the support 6 by screws or bolts 19, as clearly shown in Fig. 4. Any suitable means may be employed for imparting reciprocatory motion to the plunger and for exerting sufficient pressure thereon to cause it to effect bending of the metal, and in this instance the lever 4 is employed, the fulcrumed end of which is mounted in a slot 20 in the upper end of the support and works upon a bar or bolt 21. Intermediate of its ends the lever has pivotally connected with it the upper ends of a pair of links 22, the lower ends of which are connected with a bar 23, that connects the outer ends of a pair of links 24, the inner ends of which are pivotally connected with the sides of the support at 25. Each of the pair of links 24 is provided with a longitudinal slot 26, in which work the terminals of a bar 27, carried by the plunger, as clearly

shown in Fig. 3. By the arrangement shown it will be seen that when the lever 4 is operated either to raise or lower the plunger the slots 26 will permit free movement of the links 24 without any binding action whatever.

The formers or rollers shown in Figs. 1, 2, and 3 are plain, that is, their faces are devoid of depressions; but to effect bending of round or semicircular metal the form of rollers shown in Fig. 5 will be employed, wherein the faces thereof are provided with semicircular seats 28 for the purpose stated.

With the plunger shown in Figs. 1–3 only a plain angle bend can be effected; but where it is desired to make a double bend, such as a double L or the like, the under face of the plunger will be left flat and one corner will be cut away to form an angular inset 29, which will result in the formation of a double L or an approximately Z-shaped bend.

It will be noted by reference to Figs. 1–3 that the lower ends of the flanges 15 of the gage are rounded, as at 30, and by this arrangement the apex or point of the plunger when set for any angle will always be on a straight line with some part of the rounded terminals of the said flanges, whereby when the proper bend is effected the flanges 15 will contact with the metal strip upon the formers and stop further operation, and thereby accurately determine the angle.

While it will generally be preferred to have the machine supported in a vertical position, as shown, yet the frame may be so constructed as to adapt it to be held in operative position by an ordinary blacksmith's vise, and as this will be readily understood detailed illustration thereof is omitted.

It will be seen from the foregoing description that the machine of this invention is exceedingly simple of construction and may therefore be cheaply manufactured. In use it will always insure a square, neat, and perfect bend at the point of bending and all the iron bent will be exactly of the same contour. In nearly all shapers or machines for bending iron a separate anvil or die is required for each bend to be made, while with the device of the present invention only two polygonal rollers that are self-adjusting to any angle is necessary and the employment of dies is entirely dispensed with. The effect of the rollers on the iron is to crowd the metal toward the point of bending instead of pulling it away, as is the case with the bending-machines in common use, and this obviates the tearing effect at the bending-point which weakens the iron at the bend.

While but two styles of plungers have been illustrated and described, it is to be understood that the number of designs employed may be practically indefinite and for this reason illustration of various modifications which will readily be understood is omitted.

It will be apparent from the foregoing description, in connection with the drawings, that the formers 1 are mounted in the path of movement of the plunger 2 and the flanges 15 of the gage 3, so that when the gage is adjusted downwardly upon the plunger 2, as shown in Fig. 1, the curved ends 30 of the flanges 15 will contact with the formers 1, and thus limit the downward movement of the plunger.

Having thus described the invention, what is claimed is—

1. A machine for bending metal comprising a reciprocatory plunger, a gage adjustable relatively to the plunger, and a plurality of rotatable formers polygonal in cross-section, mounted in the path of movement of the plunger and gage.

2. A machine for bending metal comprising a reciprocatory plunger, a gage adjustably combined therewith and having rounded lower contact-points and a pair of rotatable formers polygonal in cross-section disposed beneath the plunger and arranged in the path of movement of the plunger and gage.

3. A machine for bending metal comprising a reciprocatory plunger having a pointed operative end, an adjustable gage combined therewith, and a pair of rotatable formers, polygonal in cross-section disposed beneath the plunger and arranged in the path of movement of the plunger and gage.

4. A machine for bending metal comprising a reciprocatory plunger, a gage coacting therewith, and a pair of rotatable formers, polygonal in cross-section and having their operative faces provided with semicircular grooves or seats, said formers being arranged in the path of movement of the plunger and gage.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

RANSOM D. PATTERSON.

Witnesses:
GEO. MILLER,
GUY PHILIPS.