C. A. JOHNSON.

METAL BENDING MACHINE.

APPLICATION FILED MAR. 21, 1911.

1,161,864. Patented Nov. 30, 1915.

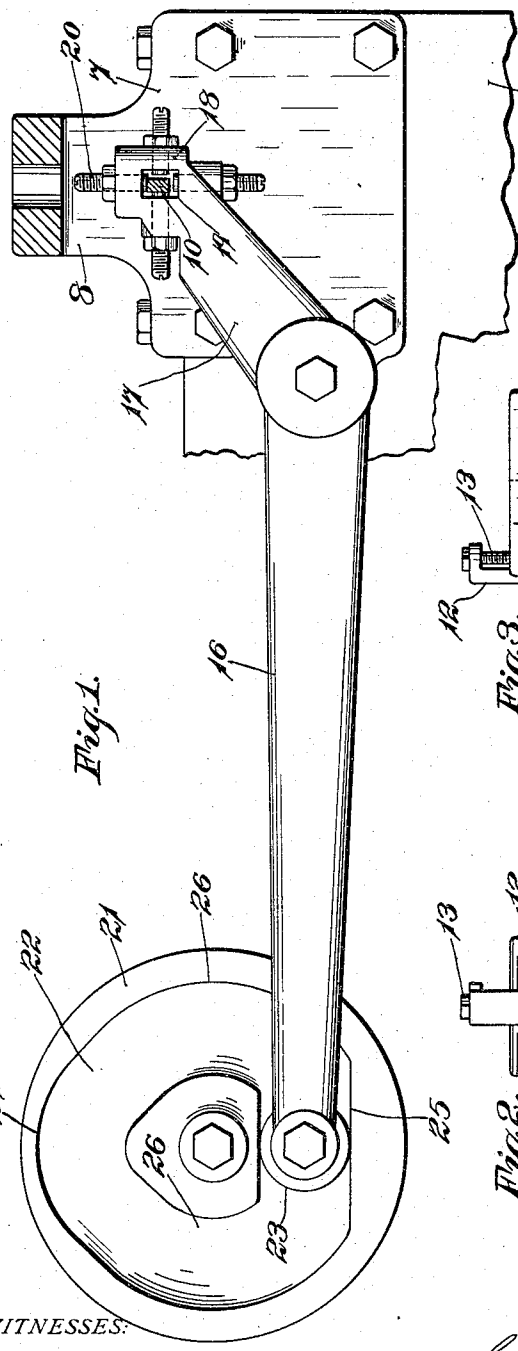

Fig. 1.

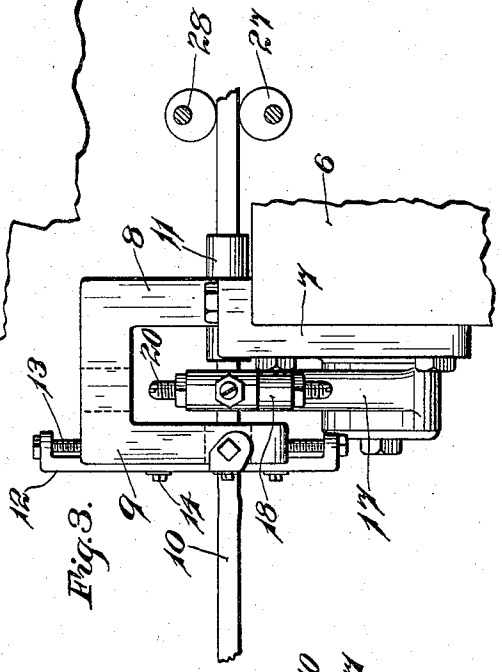

Fig. 3.

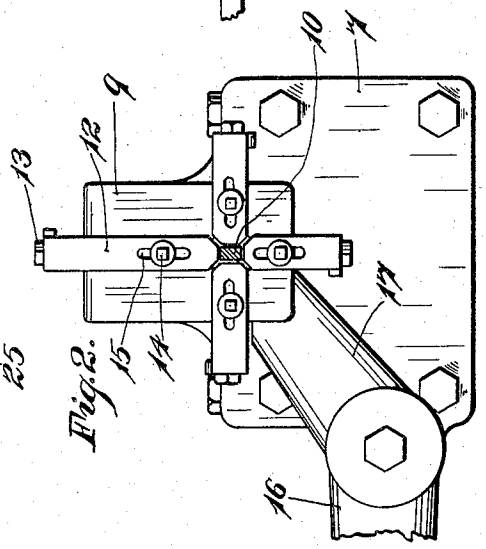

Fig. 2.

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METAL-BENDING MACHINE.

1,161,864. Specification of Letters Patent. Patented Nov. 30, 1915.

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To all whom it may concern:

Be it known that I, CHARLES A. JOHNSON, a citizen of the United States, and a resident of Unionville, in the county of Hartford and State of Connecticut, have invented a new and Improved Metal-Bending Machine, of which the following is a specification.

My invention relates to the class of devices used to straighten metal in bar, wire or similar form, and the object of the invention generally speaking is to provide a device of this class having novel features of advantage and utility.

One form of device embodying my invention and in the construction and use of which the objects herein set out, together with specific objects as will hereinafter appear, may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of a machine embodying my invention, one arm of the metal rest being broken off. Fig. 2 is a similar view with the metal rest and guide shown complete but with the straightening lever broken off. Fig. 3 is a front view of the straightening device.

While my invention is not limited to use in connection with any specific kind of apparatus, or in fact with any apparatus separate and apart from itself, yet as it finds ready application in connection with a machine for manufacturing articles from wire I have selected a portion of such a machine as a support to which my improved straightening device may be attached.

In the accompanying drawings the numeral 6 indicates a portion of the frame of a machine for producing articles from metal in bar or wire form. The metal for producing such articles is commonly arranged in a coil from which it is supplied to the machine.

The numeral 7 indicates the base of my improved straightener which may be senally adjustable in any suitable manner An inverted U-shaped arm or support projects from said base, the branches 8—9 of this arm forming guides and rests for the strip 10 of metal being straightened. A sleeve 11 is located in the branch 8 of the arm, and the branch 9 is provided with rests 12, and as shown herein these are longitudinally adjustable in any suitable manner upon the arm 9. In the form of construction herein shown adjusting screws 13 are employed for moving the rests, and bolts 14 passing through slots 15 are employed to lock the rests in place. These rests are not absolutely essential to my invention, but form a convenient means for guiding the metal which is operated upon. A straightener lever is pivotally mounted upon the base 7, this lever consisting of a cam arm 16 and a straightener arm 17, the latter having a straightener head 18. This head has an opening 19 through which the bar 10 passes, and this head is so arranged that pressure may be exerted against opposite sides of the bar 10. The device may be so arranged that this pressure is applied alternately in opposite directions to opposite sides of the bar, in the arrangement herein shown this pressure occurring simultaneously upon two adjacent sides or edges of the bar, alternately upon opposite edges or sides of the bar. As a convenient means of regulating the application of this pressure, thrust screws 20 may be supported by the head, the inner or working ends of the screws being located within the opening 19. By this means the point at which the application of force to the bar will cease may be determined to suit different conditions as to size of stock, qualities as to springiness, etc., this in order to straighten the bar by the application of said force.

When the lever is arranged to operate simultaneously on two adjacent sides or edges of the bar, as shown in Fig. 1, the pivot for said lever will be located in proper position preferably to impart the same degree of pressure simultaneously to the two adjacent sides of the bar. In the preferred arrangement, and as shown herein, this result is accomplished by locating the head so that its movement will be equal substantially on opposite sides of a line arranged at an angle of 45 degrees to the two transverse directions of application of pressure, in the present machine this application of pressure being substantially in vertical and horizontal directions. The construction herein shows the cam arm 16 as substantially horizontally arranged and the straightener arm 17 extends from its pivot at an angle substantially of 45 degrees to the cam arm. It will be seen that the relative arrangement of the straightener arm 17 and rests 12 is such that force is applied by the lever diagonally with respect to the bearing surfaces of the rest, this term "diagonally" being employed to distinguish the operation from one in

which the force might be applied in a line directly against and perpendicular to the rests. This lever may be oscillated in any suitable manner, a satisfactory arrangement including a cam 21 having a cam slot 22 within which a roller 23 secured to the arm 16 is located. This cam slot has a "rise" 24 and a "fall" 25 in its construction together with "dwells" 26. From this construction it will be noted that simultaneous pressure is brought to bear simultaneously upon the top edge and one side of the bar 10, as the lever is moved in one direction by the cam, and immediately following there is a dwell in the movement of the lever and then pressure will be brought simultaneously against the opposite edge and side of the bar, these operations occurring alternately. The dwells 26 in the cam will cause the lever to rest in a mid position, so that as the bar 10 is fed through the head its movement may be unobstructed. The bar 10 may be fed through the straightener manually, or by mechanical means, the latter being of any suitable construction. As herein shown, feed rolls 27 eccentrically mounted upon feed shafts 28, accomplish the desired result.

While I have shown a preferred form of construction embodying a single straightener arm 17, the invention is not limited to such a single arm or even to a swinging lever, and neither is it limited to an apparatus in which pressure is applied to the bar simultaneously or otherwise in transverse directions, or in opposite directions, as pressure applied alternately in opposite directions whether these opposite directions be transverse one to the other or in opposite directions in the same line, will embody the invention.

My invention contemplates a structure in which the pressure may be applied from opposite directions only, as by means of the top and bottom screws 20 alone or the side screws 20 alone. Neither do I contemplate as absolutely essential to the invention the employment of two arms 8 and 9, as all of the above mentioned details, together with other details of construction, may be departed from to a greater or lesser extent without avoiding the invention as defined by the claims herein.

I claim—

1. A machine for straightening bars including a rest for a bar of stock, a straightener member pivotally mounted with respect to said rest and disposed to apply force to a bar of stock in a line diagonally with respect to said rest, and means for operating said member.

2. A machine for straightening metal bars including a rest for a bar of stock, a pivotally mounted straightener lever including a straightener arm having contacting faces located at angles of substantially ninety degrees each from the other, the radius of said arm passing at angles of substantially forty-five degrees with respect to said contacting faces, and means for operating said lever.

3. A machine for straightening metal bars including a rest for a bar of stock, a pivotally mounted straightener lever, thrust members removably located in the straightener lever and having their contacting faces located at angles of substantially ninety degrees one with respect to the other, the radius of said lever being located at an angle of substantially forty-five degrees with respect to said contacting faces, and means for operating the lever.

4. A machine for straightening metal bars including a rest for a bar of stock, a straightener lever pivotally mounted and including a straightener arm disposed to apply force to a bar of stock in a line diagonally with respect to said rest, said lever also including an operating arm, and means for operating the lever.

5. A machine for straightening metal bars including a rest for a bar of stock, a straightener lever mounted upon a stationary pivot and including a straightener arm having an opening therethrough, thrust screws arranged on diametrically opposite sides of said opening to engage a metal bar passing through said opening, the radius of said straightener arm passing substantially through the center of said opening, and means for operating said lever.

6. A machine for straightening metal bars including a rest for a bar of stock including bearing faces located at angles each to the other, a straightener lever pivotally mounted and disposed to apply force to said bearing faces in lines diagonally with respect thereto, and means for operating the lever.

7. A machine for straightening metal bars including a rest for a bar of stock, a straightener lever mounted upon a fixed pivot with its radius extending substantially through the axis of a bar supported by said rest whereby force is applied to said bar in opposite directions, and means for operating said lever to cause it to pass to opposite sides of said axis.

8. A machine for straightening metal bars including a support, rests for a bar of stock, said rests being disposed to resist force in opposite directions, a straightener lever disposed to apply force to said rests in a direction diagonally with respect to their opposing surfaces, and means for operating said lever.

9. A machine for straightening metal bars including a U-shaped arm having openings in its opposite branches, rests for a bar of stock removably secured to one of said arms on opposite sides of the opening there-

through, a straightener lever mounted on a fixed pivot with its radius extending substantially through the center of the opening extending between said rests whereby force is applied to said bar in opposite directions, thrust members secured to said arm in substantially the same relative position as the rests with respect to a bar, and means for operating the lever.

10. A machine for straightening metal bars including a support having an opening for a bar of stock, a straightener lever pivotally mounted and having a straightener arm with its radius passing substantially through the center of said opening in said support whereby force is applied to said bar in opposite directions, a cam arm extending from said pivot in an opposite direction from the straightener arm, and a cam in engagement with said arm to move the straightening end of the straightener arm on opposite sides of the axis of the opening through said support.

11. A machine for straightening metal bars including a U-shaped arm with openings for a metal bar in opposite branches thereof, a straightener lever mounted upon a fixed pivot and including a straightener arm extending from the pivot between said branches, straightening members secured at the end of said U-shaped arm on opposite sides of the axis of the openings therein, the radius of said straightener arm passing substantially through the axis of said openings, a cam arm, and a cam engaging said arm to operate said straightener lever.

12. A machine for straightening metal bars including a U-shaped support having one branch rigidly secured to a support and the outer end of the opposite branch unsupported and with openings oppositely arranged in said branches, rests in said branches for a bar of stock, a straightener lever disposed to apply force diagonally with respect to the opposing faces of said rests, and means for operating the lever.

13. In a machine for straightening metal bars including a support for a bar of stock, a pivotally mounted straightener lever, said support being disposed to oppose movement of said lever in opposite directions and said lever being disposed to apply force to said bar in opposite directions, and means for operating the lever.

14. A machine for straightening metal bars including a rest for a bar of stock, a pivotally mounted straightener lever including a straightener arm having an opening therethrough, thrust screws arranged on diametrically opposite sides of said openings to engage a metal bar passing through said opening, said thrust screws having their contacting faces located at angles of substantially ninety degrees one with respect to the other, and the radius of said lever being located at an angle of substantially forty-five degrees with respect to said contacting faces, and means for operating the lever.

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