S. D. LOCKE.

METAL STRAIGHTENING MACHINE.

APPLICATION FILED JUNE 12, 1911.

1,042,131.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.

Fig. 1

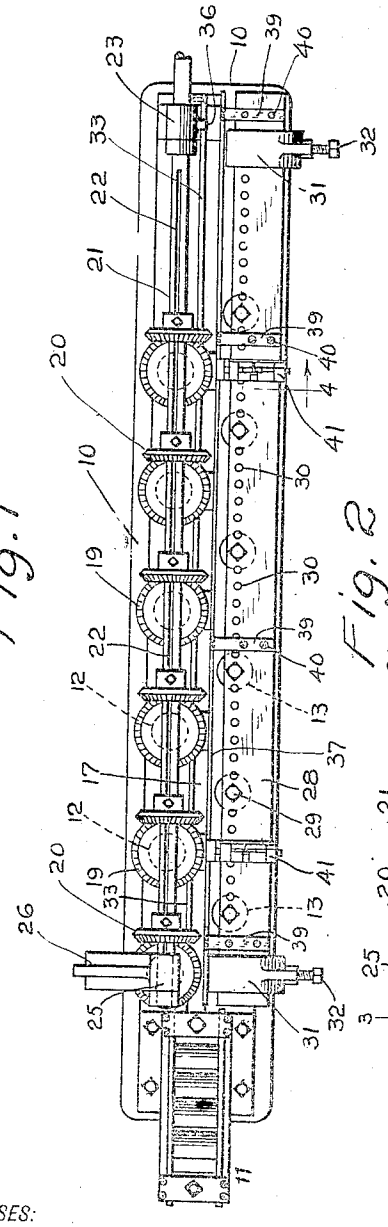
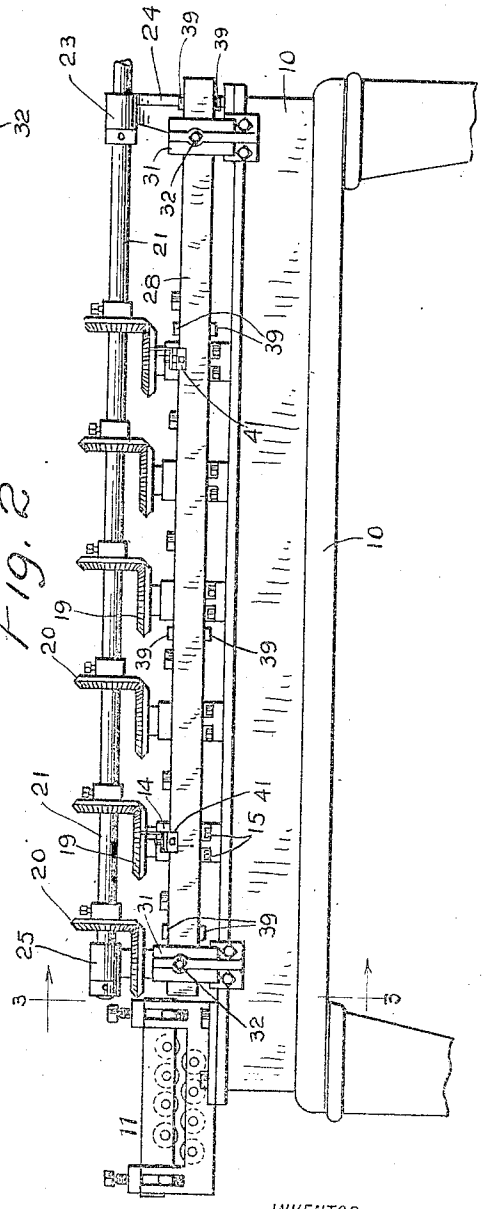


Fig. 2



WITNESSES:

H. W. Mead

S. W. Atherton.

INVENTOR

Sylvanus D. Locke

BY

A. M. Wooster

ATTORNEY

S. D. LOCKE.

METAL STRAIGHTENING MACHINE.

APPLICATION FILED JUNE 12, 1911.

1,042,131.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 2.

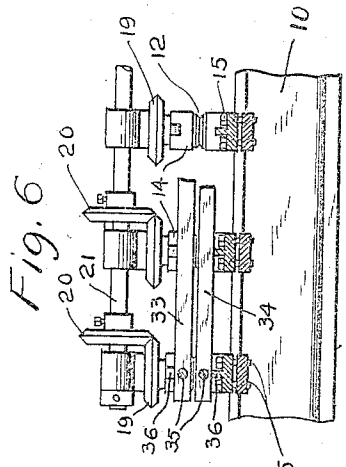


Fig. 6

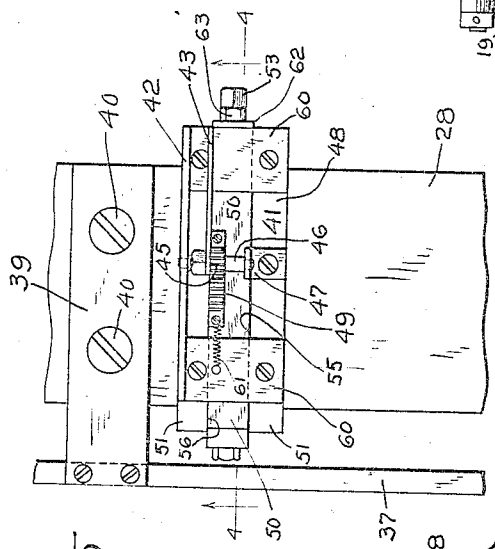


Fig. 5

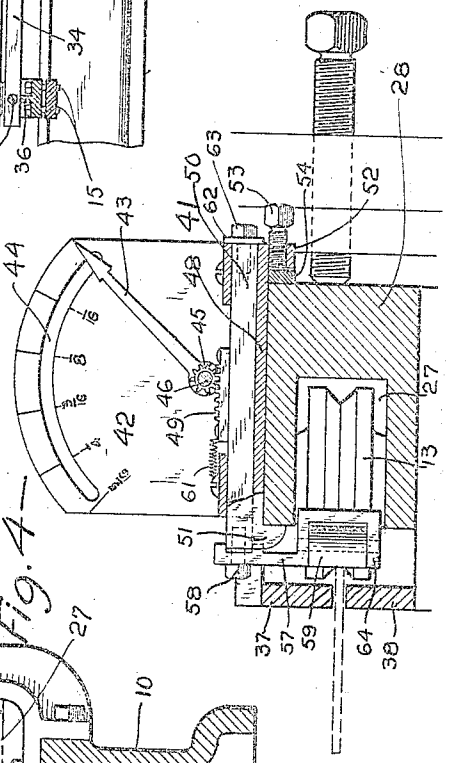


Fig. 4

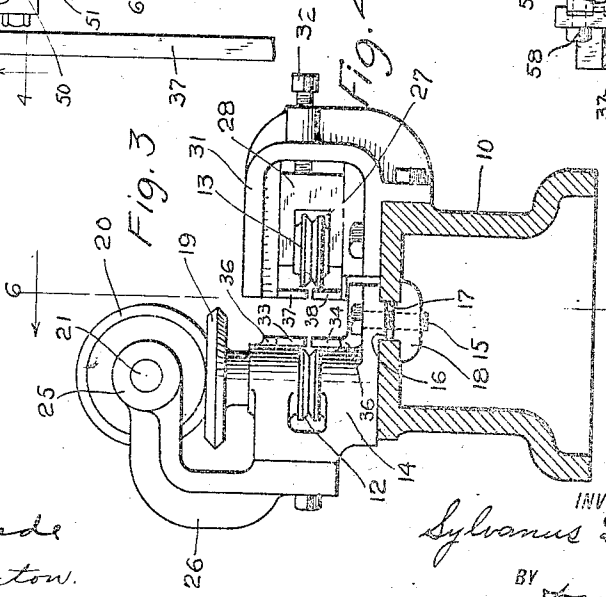


Fig. 3

WITNESSES:

H. W. Meade

S. W. Atherton.

INVENTOR

Sylvanus D. Locke

BY

A. M. Worster

ATTORNEY

UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF BRIDGEPORT, CONNECTICUT.

METAL-STRAIGHTENING MACHINE.

1,042,131. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed June 12, 1911. Serial No. 632,747.

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Metal-Straightening Machines, of which the following is a specification.

This invention relates to machines for straightening wire, rods, bars and plates by means of sets of straightening elements placed in staggered relation.

It is one of the objects of the invention to produce a metal straightening machine in which one set of straightening elements is adjustable in a group toward and from the other set.

A further object of the invention is to produce a metal straightening machine in which means shall be provided for indicating the variation of the work from a right line.

A further object of the invention is to produce a metal straightening machine in which the straightening elements have independent longitudinal adjustment.

A further object of the invention is to produce a metal straightening machine in which feeding mechanism may be dispensed with and the work carried through by the operation of the machine itself, so that the piece of work operated upon is straightened from end to end.

A further object of the invention is to produce a metal straightening machine provided with retaining plates which will prevent a flat strip of metal from buckling.

A further object of the invention is to generally improve the construction and mode of operation of this class of machine.

With these and other objects in view the invention consists in certain constructions and in certain parts, improvements and combinations which will be hereinafter described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings forming a part of this specification, in which like characters of reference indicate the same parts, I have illustrated a machine adapted to straighten plates or strips of metal edgewise.

Figure 1 is a plan view of my novel straightening machine complete; Fig. 2 a side elevation corresponding therewith; Fig. 3 a section, on an enlarged scale, on the line 3—3 in Fig. 2, looking in the direction of the arrows; Fig. 4 a section on an enlarged scale on the line indicated by 4 in Fig. 1, looking in the direction of the arrow, and showing one of the indicators partly in elevation and partly in section; Fig. 5 a plan view corresponding with Fig. 4; and Fig. 6 is a section on an enlarged scale on the line 6—6 in Fig. 3, looking in the direction of the arrows.

In carrying out the invention, I employ two sets of straightening elements, in the present instance rolls, placed in staggered relation, the elements of the first set being indicated by 12 and the elements of the second set by 13. The shafts of elements 12 are journaled in brackets 14 which are adjustable longitudinally of the bed 10 by means of bolts 15 (see Fig. 3) which pass through flanges 16 extending from the brackets and through a longitudinal slot 17 in the bed and engage nuts 18 on the under side of the slot, both the flanges and the nuts being provided with ribs engaging the slot to render displacement impossible.

19 denotes bevel gears on the shafts of elements 12 which engage bevel gears 20 on a driving shaft 21 extending longitudinally of the machine. Bevel gears 20 are secured in place after adjustment by set screws engaging a longitudinal slot 22 in the shaft. The rear end of shaft 21 is journaled in a bearing 23 on a bracket 24 secured to the bed of the machine. The front end of said shaft is journaled in a bearing 25 carried by an arm 26 which is bolted to the front bracket 14 (see Fig. 3).

Straightening elements 13 are journaled in a slot 27 in a carrying bar 28. These elements are mounted to rotate on bolts 29 which are adapted to engage any of a series of holes 30 in the carrying bar near the inner edge thereof (see Fig. 1 in connection with Fig. 3). The carrying bar is itself carried by brackets 31 which are rigidly bolted to the bed. Two only of these brackets are shown in the drawings but one or

more intermediate brackets may be used if preferred, depending upon the length of the machine. The carrying bar and elements 13 are adjusted in a group toward and from elements 12 by means of set screws 32 in brackets 31, the ends of the set screws bearing against the rear face of the carrying bar (see Figs. 3 and 4).

Whenever desirable, as in edge straightening relatively thin plates or strips of metal as shown in the drawings, I attach a straightener, indicated as a whole by 11, to the front end of the machine which operates in a plane at right angles to the other straightener. I furthermore provide pairs of retaining plates between which each edge of the strip passes to prevent the possibility of the strip buckling in the vertical plane and from springing out from between the straightening elements which may or may not be grooved.

33 and 34 denote respectively upper and lower retaining plates which act in connection with elements 12. These plates are rigidly secured to the front bracket 14 as by screws 35 (see Fig. 6) and to bracket 24 and bear upward and downward respectively against lugs 36 on the brackets so that they will stand any amount of strain that can be placed upon them in the operation of the machine.

37 and 38 denote respectively upper and lower retaining plates which act in connection with elements 13. These retaining plates are secured to and are carried by plates 39 which are themselves rigidly secured to the carrying bar, as by screws 40, so as to move with said bar.

It has already been explained that straightening elements 13 are adjustable in a group toward and from elements 12 by means of set screws 32 in brackets 31 acting upon the carrying bar. It will furthermore be apparent that the carrying bar may be adjusted out of parallelism if so desired; that is to say, a line intersecting the shafts of straightening elements 13 in the carrying bar need not be parallel with a line intersecting the shafts of straightening elements 12. In practice I so adjust the carrying bar that a line intersecting the shafts of the straightening elements on the carrying bar will incline slightly from front to back toward a line intersecting the shafts of the other set of straightening elements, which places the front straightening elements slightly farther apart than the rear straightening elements. This is in order that the straightening action upon a bar or plate of metal will not all be performed by the first elements in the two sets but that all the elements in the two sets from front to back may take part in the straightening operation with a uniformly diminishing amount of work.

In order to indicate the variation from a right line of the sides of the piece of metal being operated upon, which for convenience I will term the work, I provide suitable indicators 41 near the front and rear of the machine. These indicators may be alike, may be adjustably attached to the carrying bar in any convenient manner and may be of any ordinary or preferred construction. In the drawings I have illustrated an indicator consisting essentially of a plate 42 having upon its face a scale graduated in fractions of an inch and a pointer 43 whose movement is controlled by the edge of the work. The plate is shown as provided with a slot 44 through which the position of the pointer may be seen from the opposite side. The pointer is adjustably secured to a shaft 46 to which a pinion 45 is rigidly secured. The ends of the shaft are mounted to oscillate in a bracket 47 secured to a body 48 and and in plate 42. The pinion engages a rack 49 upon a slide 50 which reciprocates in a longitudinal slot 55 in the body. The forward end of the body is provided with downwardly extending lugs 51 which engage the front of the carrying bar and its rear end is provided with a lug 52 in which is a set screw 53 which bears against the back of the carrying bar or against a gib 54 interposed between the end of the screw and the bar. At the forward end of the body is a vertical slot 56 and at the forward end of the slide is a depending arm 57 rigidly secured thereto as by a bolt 58. This arm carries a roller 59 which bears against the edge of the work, as indicated by dotted lines in Fig. 4. The slide is retained in slot 55 by top plates 60 and is drawn inward into position to cause roller 59 to engage the edge of the work by a spring 61, one end of which is shown as connected to the rack the other to the inner top plate. The forward movement of the slide is limited by a washer 62 on a screw 63 which is tapped into the end of the slide, the washer engaging the outer end of the body and the outer top plate. When the slide is moved backward against the power of the spring by the engagement of the work with the roller, the upper portion of the depending arm will pass into the vertical slot in the body and a yoke 64 on said arm in which the roller is journaled will pass into slot 27 in the carrying bar, the indicator being of course located intermediate two of the rolls 13 and opposite a roll 12, so that the deflection of the metal by the latter roll will be indicated.

In straightening rods or bars, retaining plates 33 and 34 and 37 and 38 may be dispensed with. The longitudinal adjustment of the straightening rolls depends greatly upon the grade of work upon which the machine is used and is a matter wholly within

the judgment of the operator. Straightening rolls 13 are easily adjusted transversely of the machine in a group by means of set screws 32 which bear against the carrying bar. This set of rolls is adjusted, as already explained, with the front roll slightly farther from a line intersecting the shafts of the other set of rolls than the rear roll. This is in order to distribute the strain with a uniformly diminishing amount of work throughout the entire length of the sets of straightening rolls instead of causing it all to be performed by the rolls nearest the front of the machine. When the work is once started in the machine it will be carried through by the operation of the rolls themselves, no feeding mechanism being required. In use, the pointer of the rear indicator should be at zero, otherwise it will indicate that the work is not straight when it leaves the machine. The front indicator is preferably set near the front of the machine and will indicate the variation of the work from a right line as it enters the rolls.

Having thus described my invention I claim:

1. A metal straightening machine comprising sets of straightening elements placed in staggered relation, means for adjusting one set of elements in a group toward and from the other set and means for indicating the variation of the work from a right line.

2. A metal straightening machine comprising sets of straightening elements placed in staggered relation, means for adjusting said elements longitudinally of the machine, means for adjusting one set of elements in a group toward and from the other set and means for indicating the variation of the work from a right line.

3. In a machine of the character described, the combination with a set of straightening elements and retaining plates coöperating therewith between which the work passes, of another set of straightening elements, a carrying bar in which they are journaled, corresponding retaining plates secured to the carrying bar and means for adjusting the carrying bar toward and from the first mentioned set of straightening elements.

4. In a machine of the character described, the combination with a set of straightening elements, of a second set of straightening elements, a carrying bar for said second set, means for adjusting the ends of said bar independently and an indicator carried by said bar for showing the variation of the work from a right line.

5. In a machine of the character described, the combination with a set of straightening elements, of a second set of straightening elements, a carrying bar for said second set, means for adjusting the ends of said bar independently and an indicator carried by said bar and comprising a roller which is engaged by the work and a pointer and intermediate connections for showing the variation of the work from a right line.

6. A metal straightening machine comprising sets of straightening elements placed in staggered relation, means for adjusting one set in a group toward and from the other set and pairs of retaining plates corresponding with the sets of straightening elements respectively between which the work passes, substantially as described, for the purpose specified.

7. A metal straightening machine comprising longitudinally adjustable driven rolls, longitudinally of the machine adjustable non-driven rolls, means for adjusting the non-driven rolls in a group transversely and means for indicating the variation of the work from a right line.

8. A metal straightening machine comprising longitudinally adjustable driven rolls, non-driven rolls, a carrying bar in which the non-driven rolls are adjustable longitudinally of the machine, means for adjusting the ends of the carrying bar independently toward and from the driven rolls, and means on the carrying bar for indicating the variation of the work from a right line.

9. A metal straightening machine comprising longitudinally adjustable driven rolls, non-driven rolls, a carrying bar having a longitudinal groove, means for adjusting the non-driven rolls longitudinally of the machine in said groove, brackets for the carrying bar and means for adjusting said bar in the brackets toward and from the driven rolls.

10. A metal straightening machine comprising longitudinally adjustable driven rolls, non-driven rolls, a carrying bar having a longitudinal groove, means for adjusting the non-driven rolls longitudinally of the machine in said groove, brackets for the carrying bar, means for adjusting said bar toward and from the driven rolls and an indicator on the carrying bar, for the purpose set forth.

11. In a machine of the character described, the combination with driven rolls adjustable longitudinally of the machine, non-driven rolls adjustable longitudinally of the machine and means for adjusting the non-driven rolls in a group toward and from the driven rolls, of retaining plates between which the work passes, for the purpose set forth, and an indicator for determining the variation of the work from a right line.

12. In a machine of the character described, the combination with driven rolls

adjustable longitudinally of the machine, non-driven rolls adjustable longitudinally of the machine and a transversely adjustable carrier for the non-driven rolls, of retaining plates coöperating with the driven rolls and other retaining plates on the carrier coöperating with the non-driven rolls.

In testimony whereof I affix my signature in presence of two witnesses.

SYLVANUS D. LOCKE.

Witnesses:
A. M. WOOSTER,
S. W. ATHERTON.