(No Model.) 3 Sheets—Sheet 1.

J. B. & J. J. SCHNEIDER.

METAL BENDING MACHINE.

No. 523,413. Patented July 24, 1894.

Fig. 1

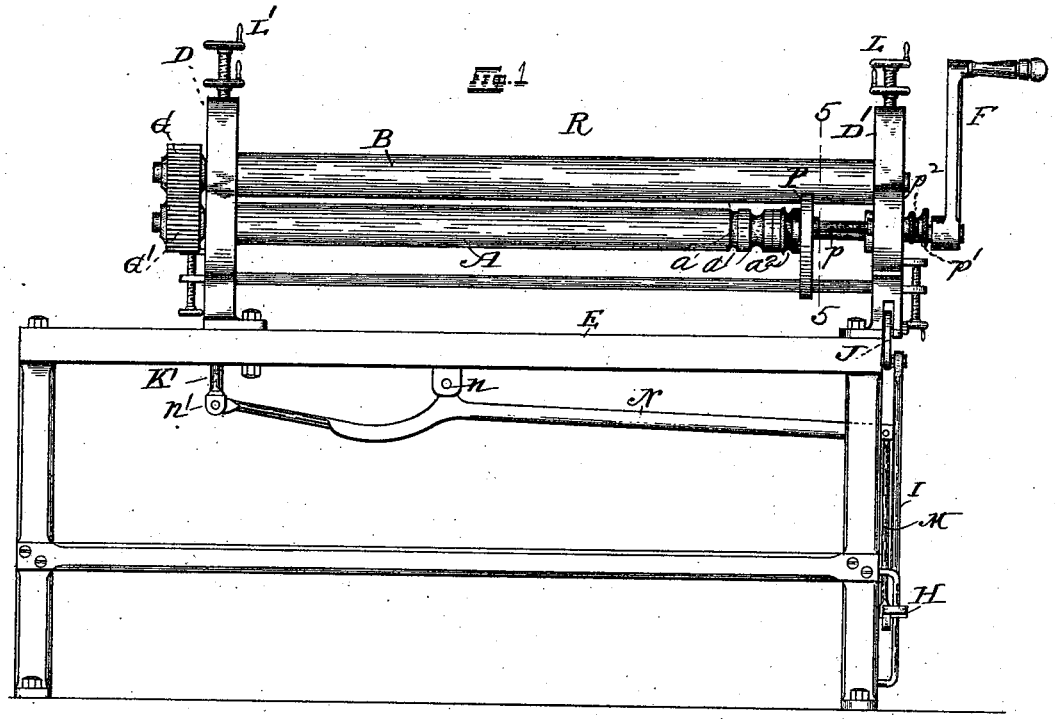


Fig. 2

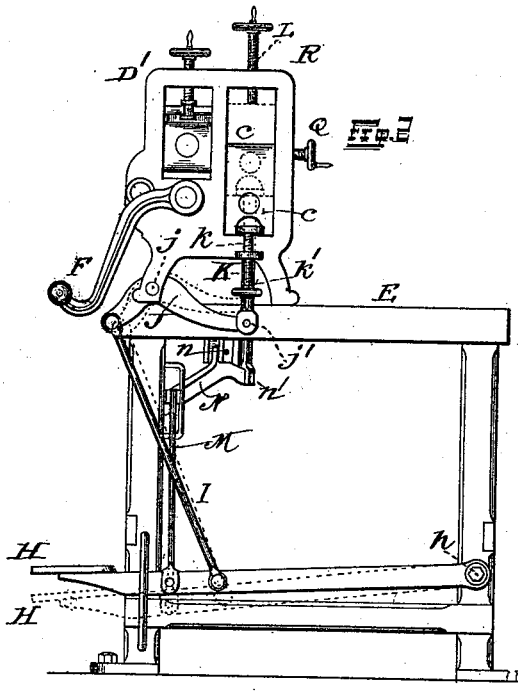
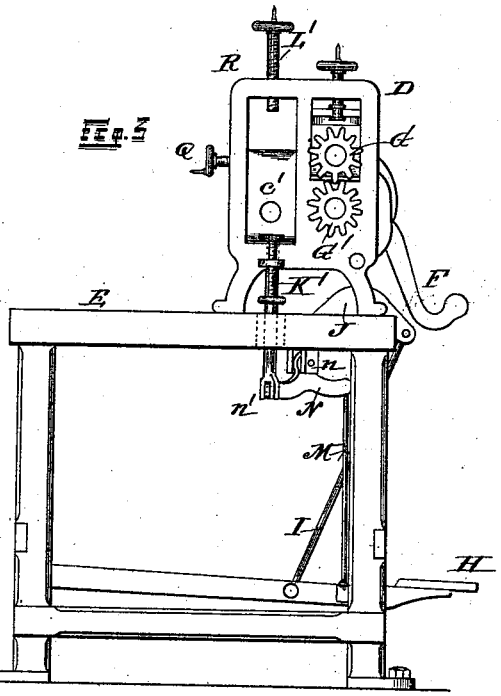


Fig. 3



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(No Model.) 3 Sheets—Sheet 2.

J. B. & J. J. SCHNEIDER.

METAL BENDING MACHINE.

No. 523,413. Patented July 24, 1894.

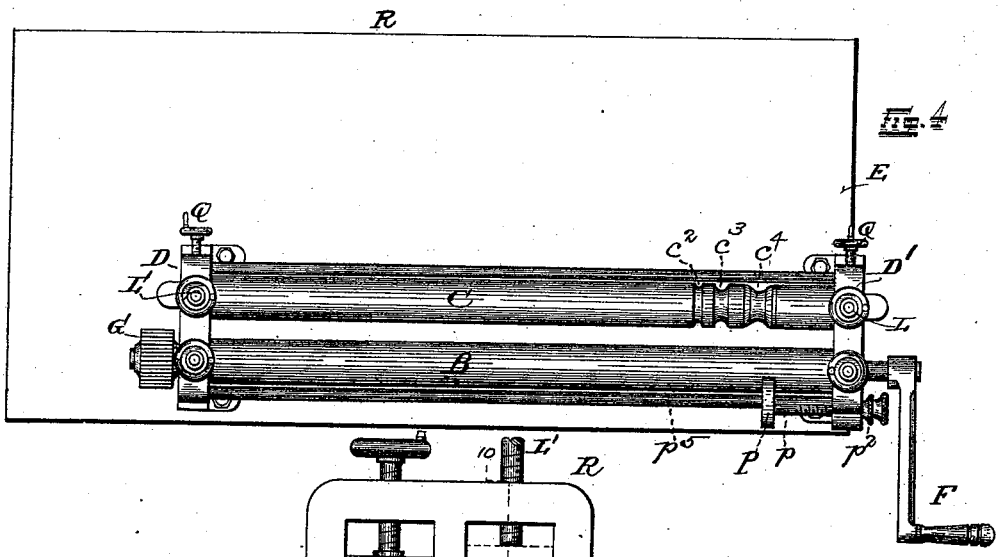


Fig. 4

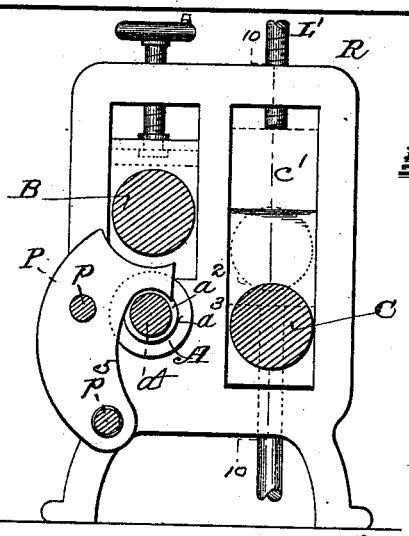


Fig. 5

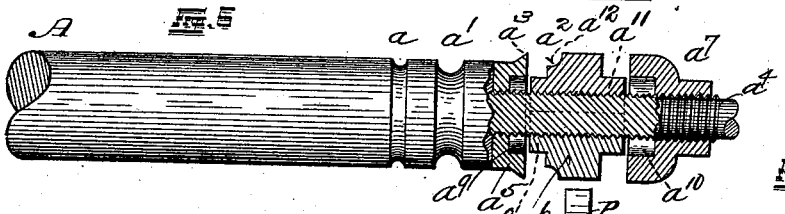


Fig. 6

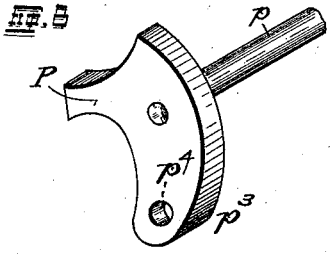
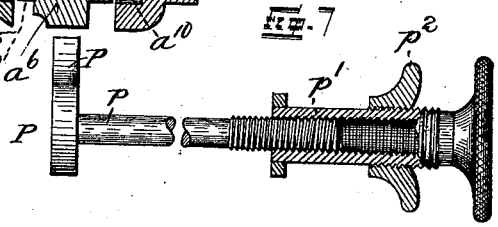


Fig. 7



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(No Model.) 3 Sheets—Sheet 3.

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METAL BENDING MACHINE.

No. 523,413. Patented July 24, 1894.

Fig. 9

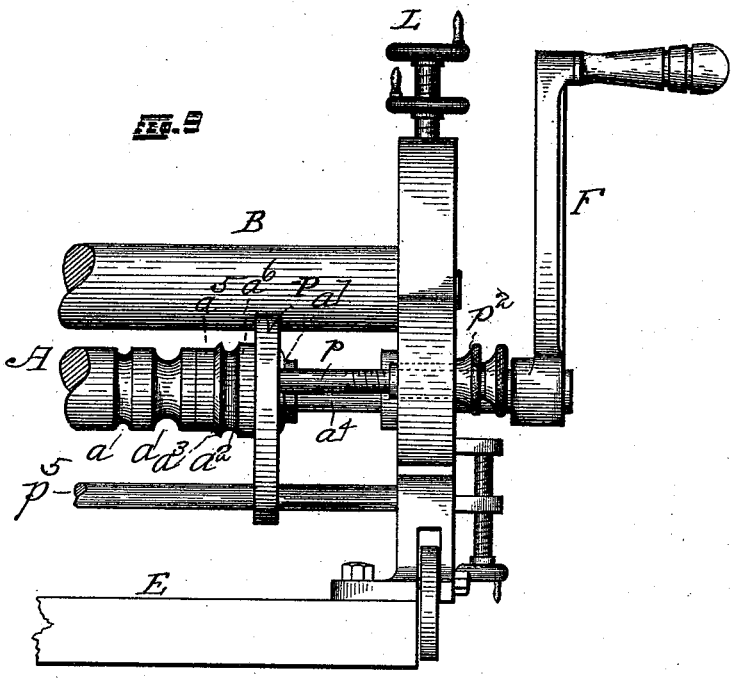


Fig. 10

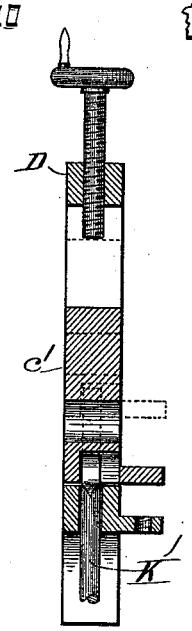


Fig. 11

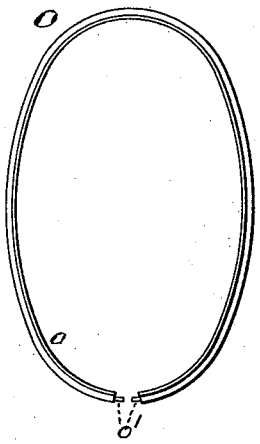
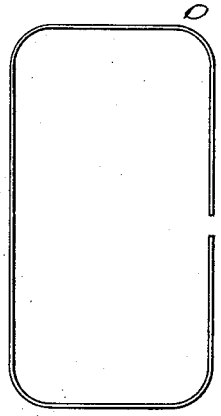


Fig. 12



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UNITED STATES PATENT OFFICE.

JOHN B. SCHNEIDER AND JOHN J. SCHNEIDER, OF ST. LOUIS, MISSOURI.

METAL-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 523,413, dated July 24, 1894.

Application filed April 26, 1893. Serial No. 471,886. (No model.)

To all whom it may concern:

Be it known that we, JOHN B. SCHNEIDER and JOHN J. SCHNEIDER, both of St. Louis, Missouri, have made a new and useful Improvement in Metal-Bending Machines, of which the following is a full, clear, and exact description.

The improvement under consideration has reference more particularly to that class of metal-bending machines which are known as forming machines and used for shaping tin-plate or boiler-iron into curved forms, and the improvement consists partly in the means whereby the shape imparted can be readily changed as the work is passing through the machine, partly in the provision for wiring as well as shaping the work, and partly in minor features of the construction, substantially as is hereinafter set forth and claimed, aided by the annexed drawings, making part of this specification, and exhibiting the most desirable mode of carrying out the improvement, and in which—

Figure 1 is a front elevation of the improved machine; Fig. 2 the right-hand end elevation thereof; Fig. 3 the left-hand end elevation thereof, and Fig. 4 a plan thereof; Fig. 5 a vertical longitudinal section on the line 5—5 of Fig. 1; Fig. 6 a sectional elevation of the lower front roll, showing the parts employed in wiring, and the parts in question being shown spaced apart from each other; Fig. 7 a sectional plan of the guide; Fig. 8 a view in perspective of that portion of the guide with which the work immediately comes into contact; Fig. 9 a view similar to that of Fig. 1, but showing only the right hand portion of the upper part of the mechanism; Fig. 10 a vertical transverse section on the line 10—10 of Fig. 5; and Figs. 11 and 12, views illustrating shapes of work which the machine is adapted to produce; in Fig. 11 the wire is shown. Figs. 5 to 10 inclusive are upon an enlarged scale.

The same letters of reference denote the same parts.

R represents the improved machine. It is of the usual construction, and is operated in the usual manner, saving as the same may be modified by the improvement under consideration.

A represents the lower front roll, B the upper front roll, and C the forming roll or bending-cylinder.

D and D′ are the uprights which sustain the rolls, and E the table or frame which constitutes the sub-structure of the machine, and which sustains the uprights and the treadle mechanism. The front rolls are journaled in the usual manner in the uprights, the upper front roll is vertically adjustable as is customary, the lower front roll is provided with the usual crank F, and the front rolls are geared by means of the pinions G, G′, to work in the ordinary manner. Instead however of adapting the forming roll C to be vertically adjusted by hand and by means of vertically arranged screws engaging in the forming roll boxes in the uprights it is arranged to be vertically adjusted in such a manner as to leave the hands of the operator free to manipulate his work. To this end we preferably employ a treadle-mechanism, and substantially as follows:

H represents a treadle adapted to be operated by the foot of the operator and pivoted at *h* to have a movement substantially as is indicated by the different positions of the treadle shown respectively in the full and the broken lines in Fig. 2. The treadle by means of the rod I is jointed to a lever J that is pivoted at *j*, and at *j′* is jointed to a thrust-rod K which in turn is jointed to the box, *c*, of the forming roll at the right hand end thereof. By depressing the lever the box and forming roll are elevated as indicated by the broken lines in Fig. 2.

L represents a vertically-adjustable stop, say in the form of the screw shown, and which can be screwed upward and downward in the upright D′, and according to its position to serve as a means for limiting the elevation of the forming roll box *c*. That is, as long as the treadle is not depressed, the forming roll and its box occupy their down-position. But by depressing the treadle the forming roll is elevated into its up-position. The thrust-rod K is made in parts *k*, *k′*, which are threaded to engage with each other to enable the thrust-rod to be lengthened or shortened for the purpose of arranging the lower position of the forming roll at any desired level.

It is practicable to carry out the improvement in part by having the right hand end only of the forming roll vertically adjustable. But to more fully carry out the improvement the forming roll can be vertically adjusted throughout its length. And for this purpose the treadle, by means of a rod M, is jointed to a lever N that is pivoted at n and at n' jointed to a thrust rod K′ that is similar to the thrust-rod K, and that is connected with the box c' of the forming roll at the left hand end thereof. Thus when the treadle is depressed the forming roll is raised evenly throughout its length, and a vertically-adjustable stop L′ in the upright D serves to limit the lift of the forming-roll at the left hand end thereof. The operator is thus enabled to operate the crank F and to handle his work and at the same time, and by means of the described treadle-mechanism, to control the position of the forming roll, and thus, and without doing anything saving to operate the treadle, he is able to alter the curve of the shape which is being imparted to the work. For instance an oval such as exhibited in Fig. 11 can be produced by elevating the forming roll to form the curved portions having the smaller radius and lowering the forming roll to produce the curved portions having the larger radius. And, again, if a shape such as shown in Fig. 12 is needed the lower limit of the forming roll can be arranged for straight or flat work such as shown at the sides and ends of the form shown in Fig. 12, and the upper limit of the forming roll can be arranged for producing the curves which appear at the corners of the shape referred to. The operation of thus variously curving a metal plate is thus greatly facilitated.

The lower front roll A is grooved in the usual manner at a, a', as is also the forming roll C at c^2, c^3. But to enable the present machine to be used for wiring as well as for shaping the forming roll has an additional groove c^4, and the lower front roll A has an additional groove a^2. At the left hand side of said last mentioned groove the roll A is shaped to form or is provided with a pointed, or substantially-pointed, flange a^3. The wire portion, o, of the work O passes through the grooves c^4 a^2, and the described flange a^3 serves to tuck the edge of the hem around the wire o' in such passage. As the wire used in different pieces of work, and the corresponding beads containing the wire, vary somewhat in diameter, it becomes necessary to provide for widening the groove a^2, and also deepening it, in order to properly sustain the wired portion of the work. To this end the groove a^2 is adapted to be enlarged or contracted, and preferably in the following manner: The roll A is provided with a threaded stem a^4; this stem receives a ring, a^5, another ring a^6, and a nut a^7. These parts are shown spaced somewhat apart from each other in Fig. 6. The ring a^5 is screwed onto the stem to bring its flange a^3 into position upon the rolls; the ring a^6 is preferably made in two halves to enable it to be readily applied, and in applying it to the roll its end, a^8, is adapted to enter a corresponding recess, a^9, in the ring a^5; the nut a^7 is also recessed at a^{10} to pass onto the end a^{11} of the ring a^6; by this means the ring a^6 is secured in position upon the roll. When it is desired to form a groove a^2 of different diameter the nut a^7 is unscrewed and the ring a^6 also unscrewed sufficiently for its parts to clear the ring a^5, and nut a^7, and then another two-part ring a^6 is applied to the roll in place of the one removed. The rings a^6, at the point a^{12}, are shaped differently to enable grooves of different diameters to be formed, and when a groove of a certain diameter is required the ring a^6 having the proper contour, a^{12}, is in the manner described attached to the roll.

P represents a guide which is useful in directing the work in its passage through the rolls. It is essentially a shoulder laterally adjustable in front of the rolls A, B, and capable of being sustained in position to guide the work at a point between the rolls A, B. This point varies somewhat to suit the work being done. Accordingly the guide is attached to a stem p which in turn is sustained from the upright D′.

It is important that the guide in question extend between the rolls A and B, substantially as shown in Fig. 4. In consequence the guide cannot be rotated in its adjustment, and accordingly the stem p in place of being connected directly with the upright D′ is threaded to engage in a tubular screw p' which in turn is adapted to be held in the upright D′; by rotating the part p' the stem p is screwed to the right or left and the guide P adjusted accordingly. The part p' can be readily tightened in the standard D′ by means of the lock-nut p^2. To steady the guide that part is extended downward at p^3 and is perforated at p^4 to enable the guide to be slipped upon the rod p^5 which extends and is held in the uprights D, D′, substantially as shown.

The three features named, namely the forming roll vertically adjustable between certain limits, the groove in the roll A for wiring, and the guide for directing the work, are useful in combination as thereby work can not only be curved variously but also variously-curved work can be readily wired. When it is desired to fix the forming roll at a certain elevation set screws, such as shown at Q, and which work through the uprights, may be employed to tighten the boxes c, c'.

We claim—

1. In a metal bending machine, the combination with the frame E, the uprights D, D′, the lower front roll A, the upper front roll B, and the forming roll C, of the boxes c, c', in which the forming roll is journaled, the thrust rods K, K′ jointed respectively to said boxes c, c', the lever J, pivoted to the frame and also

to the rod K, the rod I pivoted to said lever, the lever N pivoted to the frame and connected with rod K′, the rod M, connected with lever N, and the treadle to which rods I and M are pivoted, substantially as described.

2. In a metal bending machine the combination with the upper front roll B, the lower front roll A, having the shaping grooves a, a', and the wiring groove a^2, and the intermeshing gears secured to said rolls, of the vertically adjustable forming roll C, grooved at c^2 and c^3 and having a wiring groove c^4, said rolls being journaled in uprights secured to the frame of the machine and the treadle and intervening mechanism for vertically adjusting the forming roll, substantially as described.

3. The combination of the roll A, the threaded stem a^4, the recessed ring a^5 at the end of said rod, the two part ring a^6, and the nut a^7 the latter ring and nut threaded to move on said stem, said ring a^6 having the contour a^{12}, and said ring a^5 having the flange a^3, substantially as described.

4. In a metal bending machine, the guide P, having stem p, combined with the screw threaded tubular part p', on said stem and the lock nut p^2, and with the upright D′, by which said guide is sustained, and with the feed rolls, substantially as described.

5. In a metal bending machine, the combination of the feed rolls with the guide P, having stem p, and perforated at p^4, and the rod p^5, passing through said perforation, whereby said guide can be longitudinally adjustable between said rolls, in the manner described.

Witness our hands this 22d day of April, 1893.

JOHN B. SCHNEIDER.
JOHN J. SCHNEIDER.

Witnesses:
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A. BONVILLE.