May 1, 1928.

1,668,298

C. M. YODER

METAL WORKING MACHINE

Original Filed Nov. 24, 1922 3 Sheets-Sheet 1

Fig. 1.

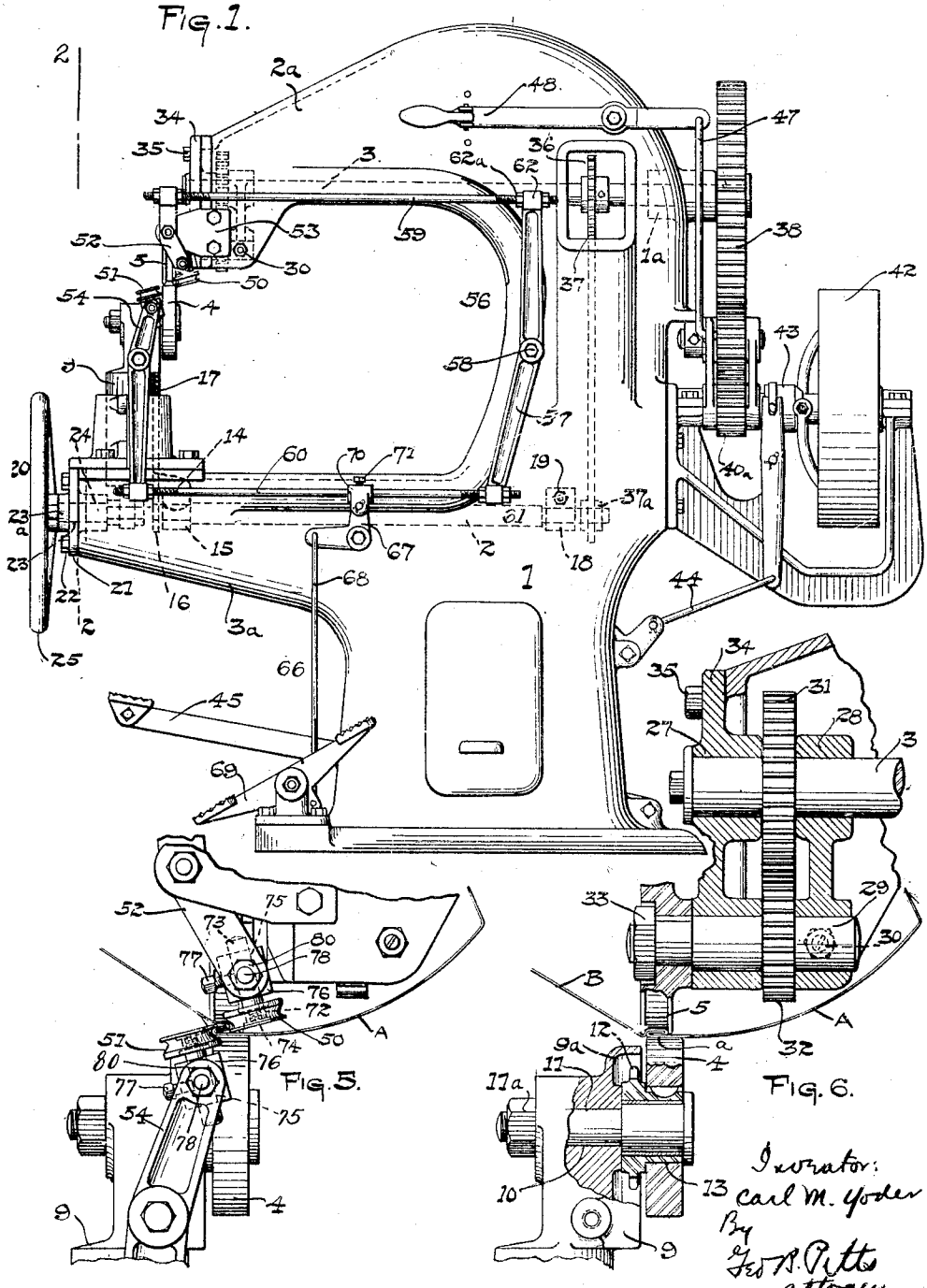


Fig. 5.

Fig. 6.

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Original Filed Nov. 24, 1922 3 Sheets-Sheet 2

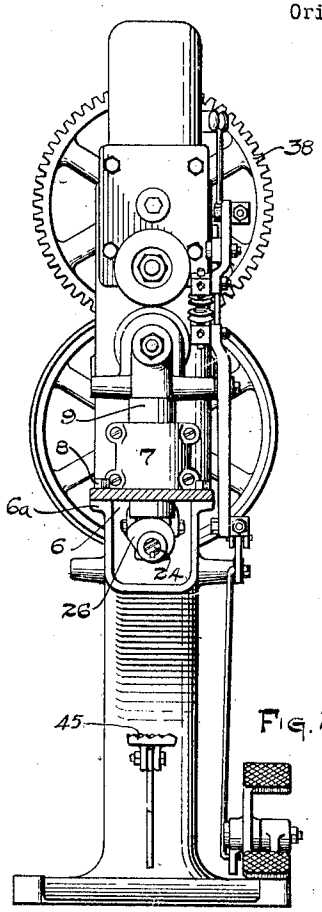


Fig. 2.

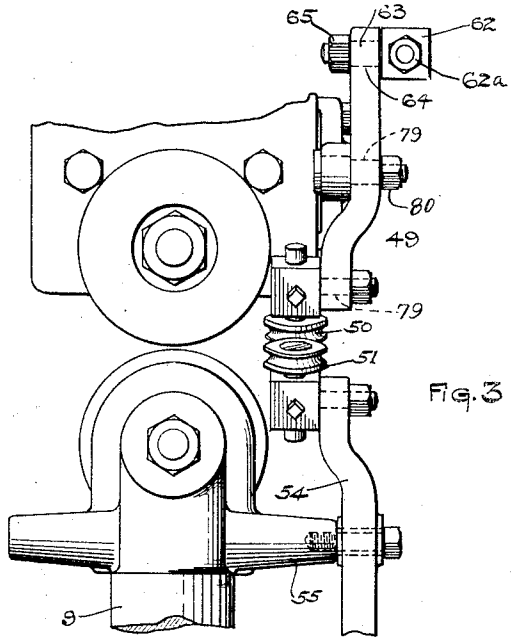


Fig. 3

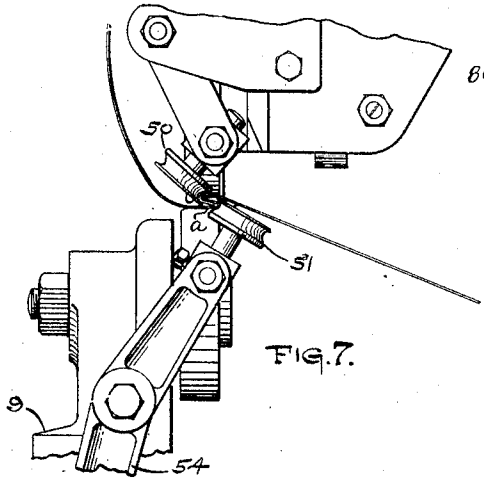


Fig. 7.

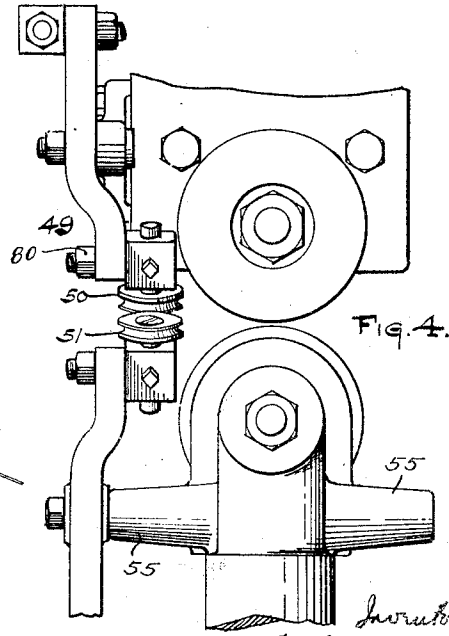


Fig. 4.

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May 1, 1928. C. M. YODER 1,668,298

METAL WORKING MACHINE

Original Filed Nov. 24, 1922 3 Sheets-Sheet 3

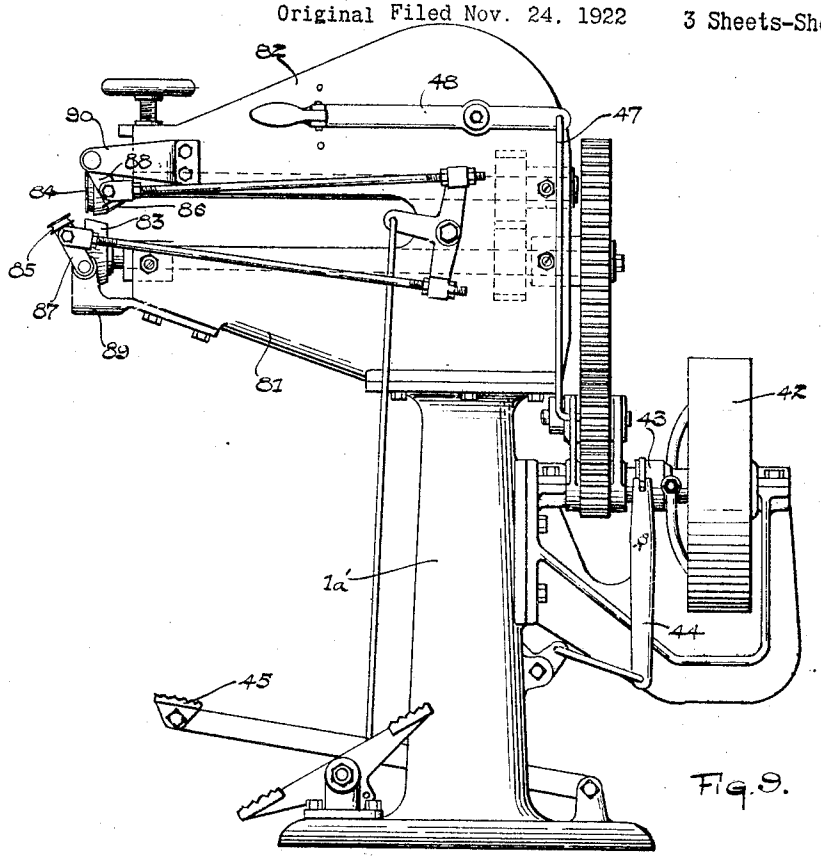


Fig. 9.

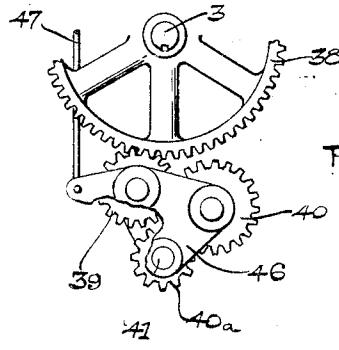


Fig. 8.

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Patented May 1, 1928. 1,668,298

UNITED STATES PATENT OFFICE.

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METAL-WORKING MACHINE.

Application filed November 24, 1922, Serial No. 602,962. Renewed November 9, 1927.

This invention relates to a metal working machine, more particularly for seaming strips or sections of sheet metal together, such as fenders and skirts for automobiles.

One object of the invention is to provide a machine of this character of relatively simple construction, comprising few parts which may be readily operated.

Another object of the invention is to provide a machine of this character with an attachment capable of holding and guiding the strips or sections of metal to the seaming elements, whereby they may be seamed rapidly and easily, as well as accurately.

Other objects of the invention will be apparent to those skilled in the art to which my invention relates, from the following description, taken in connection with the accompanying drawings, wherein,

Fig. 1 is a side elevation of a machine embodying my invention.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary front view of the machine, enlarged.

Fig. 4 is a view similar to Fig. 3, but showing the holding and guiding members on the other side of the machine, whereby the strips or sections to be seamed may be fed to the seaming elements in the other direction.

Fig. 5 is a fragmentary view showing the holding and guiding members in operative position, holding and guiding two strips or sections of metal.

Fig. 6 is a fragmentary sectional view through the seaming elements, showing the operation of seaming two strips or sections of metal.

Fig. 7 is a view similar to Fig. 5, but showing the holding and guiding members reversed to seam a fender and a skirt, where these parts are reversed as compared to that shown in Fig. 5.

Fig. 8 is a detailed view of the power reversing mechanism for the driving shaft.

Fig. 9 illustrates a machine embodying my invention but of slightly modified construction.

In the drawings, 1 indicates a frame which may be of any desired construction, being preferably hollow to reduce its cost and weight, while providing a support for the driven shafts 2, 3, to be later referred to. The frame 1 is fashioned to provide upper and lower arms 2^a, 3^a, which support the metal working elements, that is, the seaming elements 4 and 5, respectively, at their outer ends, and provide ample space to permit free movement of the metal strips between the arms, as they pass the seaming elements 4, 5. The upper surface of the arm 3^a, near its outer end, is formed with an opening 6, which is flanged at 6^a, to form a seat for a tubular member 7. The tubular member 7 is flanged at its lower end, and such flange rests on and is secured to the flange 6^a, preferably by cap screws 8. 9 indicates a standard guided to move vertically in the tubular member 7. The upper end of the standard 9 is provided with an opening 10 (see Fig. 6) to receive a stud shaft 11. The stud shaft 11 is secured in position in the opening 10 by means of a nut 11^a, engaging it at one end. The opposite end of the stud shaft 11 serves as a support for a sprocket 12, having a hub 13, to which is keyed, in a well-known manner, the seaming element 4.

At its lower end, the standard 9 carries a lug 14, to which is pivotally connected a collar 15, forming a bearing for the front end of the shaft 2. The shaft 2 extends through the bearing 15, and carries at its outer end a sprocket 16, in line with the sprocket 12, whereby the latter may be driven by the former by a chain 17. The rear end of the shaft 2 is supported by a bearing 18, pivotally supported by a cross rod 19, supported at its opposite ends in the walls of the frame 1. By pivotally supporting the shaft 2 at its rear end in the frame 1, and supporting its outer end on the standard 9, it will be seen that the latter may be moved or adjusted vertically while maintaining driving connection with the sprocket 12, to which the seaming element 4 is connected. By preference, the wall of the standard 9 is shaped to form a guard 9^a for the sprocket 12, as most clearly shown in Figs. 6 and 7.

20 indicates as an entirety adjusting means for the standard 9, whereby the seaming element 4 may be caused to cooperate with the seaming element 5, to seam the strips of metal according to the gauge of the metal being operated upon. Of these means, 21 indicates a plate fixed to the front end of the arm 3^a, preferably by means of cap screws 22. The plate 21 is formed with

an opening 23, and provided with tubular bosses 23^a, 23^a, which form a bearing for a shaft 24. The shaft 24 carries a hand wheel 25 at its outer end. At its inner end the shaft 24 is provided with a cam 26 which engages the lower end of the standard 9, as shown in Fig. 2, preferably in line with its axis. If the hand wheel 25 is rotated in one direction, the cam 26 will cause the standard 9 to move upwardly; if it is moved in the opposite direction, it will allow the standard to move downwardly.

27, 28, indicate a pair of spaced members, formed with pairs of aligned openings; one pair of such openings serves to receive and support the front end of the shaft 3, and the other pair serves to receive and support a shaft 29. The member 28 is preferably supported at its upper end by the shaft 3, while its lower end is held stationary between a pair of bolts 30, only one of which is shown in Figs. 1 and 6. The members 27 and 28 are spaced relative to each other, to provide room for gears 31, 32, keyed in a well known manner to the shafts 3, 29, respectively, and meshing with each other, whereby the power of the shaft 3 is transmitted to the shaft 29. The outer end of the shaft 29 is preferably reduced to receive the hub of the seaming element 5, this hub being keyed to the shaft and held thereon by a nut 33. The shaft supporting member 27 is preferably held in position by a plate 34, secured to the front end of the arm 2^a by a cap screws 35. The shaft 3 is provided with a sprocket 36, over which a chain 37 runs, said chain engaging a sprocket 37^a on the shaft 2, and thus transmitting the power thereof to the shaft 2. As shown in Fig. 1, the frame 1 is provided in its rear wall with an opening surrounded by bosses 1^a, which serve as a bearing for the extended inner end of the shaft 3. 38 indicates a gear fixed to the free end of the shaft 3, beyond the frame 1. The gear 38 meshes with a gear 39, which in turn meshes with a gear 40. The gear 40 meshes with a gear 40^a, which is fixed to a main driving shaft 41; the shaft 41 is preferably driven by a belt pulley 42, being connected to the shaft 41 and disconnected therefrom by a suitable clutch 43, operated through connections 44 by a foot pedal 45. The gears 39 and 40 are mounted in a frame 46, which straddles the gear 40^a, and loosely pivots on the shaft 41, whereby it may swing to the position shown in dotted lines in Fig. 8 to cause the gear 40 to engage the gear 38 and the gear 39 to disengage the latter. When thus operated, the rotation of the shaft 3 will be reversed. The frame 46 may be operated by a link 47 connected to a hand lever 48. The mechanism for reversing the direction of rotation of the gear 38 is desirable so that the machine may be equipped with my improved holding and guiding attachment, indicated as an entirety at 49, at either side of the frame 1, whereby sheets or strips of metal to be seamed together may be fed to the seaming elements in either direction, it being obvious that in some instances the sheets or sections of metal must be guided to the seaming elements in one direction and in other instances in the other direction. The seaming elements 4, 5, preferably comprise a flat roller and a channeled roller, respectively, which co-operate, as shown in Fig. 6, to roll down the interlocking flanged portions *a* of the metal strips, such a fender A and a skirt B, into a seam.

Of the holding and guiding attachment 49, 50, 51, indicate a pair of grooved rollers adapted simultaneously to engage the sheets of metal along their folded edges, and through their co-action, one with the other, to hold the interlocked flanged portions *a* of the sheets in assembled relationship (see Fig. 5) while guiding such portions to the seaming elements 4, 5. The rollers 50, 51, are mounted to move relatively to each other, that is, outwardly, to permit the positioning of the sheets of metal between them (see Fig. 1) and then toward each other into operative position, as shown in Fig. 5, to maintain the flanges *a* in interlocked relation or position for seaming. As will be understood from Figs. 1 and 5, the rollers 50, 51, (1) when in their separated position, are disposed at opposite sides of the plane in which the seaming elements are disposed, but move in a direction transverse to that plane toward each other to engage the folded edges of the sheets and (2) are arranged simultaneously to engage the folded edges of the metal sheets at a position which is or which maintains the interlocked flanges in alignment with the seaming elements 4, 5. By maintaining the rollers in engagement with the folded edges of the metal sheets, they will serve to hold the latter in assembled relationship as well as to properly guide them to the seaming elements. 52 indicates a lever pivotally mounted upon a bracket 53, and carrying at its lower end the roller 50. 54 indicates a lever pivotally mounted upon a boss 55 projecting laterally from the standard 9 and carrying at its upper end the roller 51. As shown, the levers are mounted on axes which extend in a direction transverse to the direction of movement of the sheets or strips through and between the elements 4, 5, so that the holding and guiding rollers 50 and 51 move toward each other at substantially right angles to the direction of movement of the metal strips or interlocking portions thereof. The levers 52, 54, are connected to suitable devices, indicated as an entirety at 56, whereby they may be moved simultaneously. The devices 56 preferably comprise a lever 57, fulcrumed intermediate its ends at 58, the upper end of the

lever being connected by a rod 59 to the upper end of the lever 52, and the lower end of the lever 57 being connected by a rod 60 to the lower end of the lever 54. As will be understood from Figs. 1 and 2, the connection 61 between the lever 57, and the rods 59, 60, respectively, and between the latter and the levers 52, 54, respectively, are pivotal ones, to permit of relative movements between these elements. Preferably each connection 61 comprises a block 62, which is formed with an opening to receive the adjacent rod. As shown, the rod is threaded to receive nuts 62[a], which are tightened against the block, and thus secure the rod and block together. This arrangement also permits each rod to be adjusted, relative to the levers 57 and 52 or 54, to insure proper co-action between the holding and guiding rollers 50, 51. At one side the block is provided with a pin, 63, which loosely fits an opening 64, in the adjacent lever. The outer end of the pin 63 is threaded to take a nut, 65, to prevent disengagement of the lever and rod.

66 indicates as an entirety means for operating the devices 56. The operating means 66 may comprise a bell crank 67, having a pivotal connection with one of the elements of the operating devices 56, such as the rod 60, a link 68 connected at one end to the bell crank 67, and at its other end to a foot pedal 69. The bell crank 67 is pivotally connected to a collar 70, which in turn is adjustably connected to the rod 60, preferably by a set screw 71.

Each of the rollers 50, 51, is preferably mounted for adjustment, namely, in a direction that is substantially transverse to the plane in which the other roller is mounted, and angularly about the end of the adjacent lever, whereby their relative relationship when in operative position may be changed to insure their positive operation, according to the size or width of the folded portions of the sheet metal and the interlocking relationship of the sections to be seamed. As the mounting for each roller 50, 51, is similar to that for the other roller, a description of the mounting for one of them will be sufficient. For example, the roller 50 is loosely mounted in a bushing 72, which is supported on the free end of a stud shaft 73 by a screw 74, fitting an opening in the end of the shaft. The shaft 73 slidably fits an opening 75 formed in a block 76, being fixed therein by a set screw 77. The block 76 is rigidly connected to a bar 78, which rotatably fits an opening 79 formed in the free end of the lever 52. The pin or bar 78 extends through the opening 79, and is screw threaded at its outer end to take a nut 80, whereby it may be secured in its adjusted position. This construction is advantageous since it permits the rollers 50, 51, to be transposed so that the roller 50 is at the outer side of the rolling down or seaming elements 4, 5, and the roller 51 is at the inner side thereof—see Fig. 7, such arrangement being desirable when the seaming operation is to be effected upon a pair of metal strips or sheets transposed from that shown in Fig. 5.

As will be understood from the drawings, the lever 54 is mounted on the standard 9, and moves therewith whenever the standard is adjusted, this arrangement serving to maintain the holding and guiding roller 51 in alignment with the adjacent seaming element 4 at all times.

The attachment 49 may be arranged upon either side of the frame 1 or the attachment may be duplicated upon opposite sides thereof. In this latter construction certain elements thereof may be removed, dependent upon the direction in which the metal sheets are fed to or through the seaming elements. For this purpose, the standard 9 is provided with a boss 55, at either side thereof, and the frame 1 is formed on its opposite sides with openings for the fulcrums 58 for the levers 57.

In Fig. 9 I have shown a slightly modified form of metal working machine in which the operating elements may be shaped to seam or bead the interlocking sections of the metal. Referring to this figure, $1^{a'}$ indicates the frame having spaced projecting arms 81, 82, carrying at their outer ends a pair of metal working elements 83, 84, respectively. 85, 86, indicate a pair of holding and guiding rollers loosely mounted on levers 87, 88, respectively, hereby they may be moved toward or from each other. The levers, 87, 88 are pivotally mounted on brackets 89, 90, carried by the arms 81, 82, respectively. The levers 87, 88, are connected by rods 91, 92, respectively, to the free ends of a lever 93 pivotally mounted on the frame $1^{a'}$. The lever 93 is connected by a rod 94 to a foot lever 95, whereby the guiding rollers 85, 86, are moved simultaneously toward each other or in the opposite direction.

To those skilled in the art to which my invention relates many modifications and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope thereof. It will me understood that the description and the disclosures herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. In a machine of the character described, the combination of a pair of elements having their axes in a common plane for rolling down interlocked portions of metal sheets, and a pair of devices mounted in front of said elements, one of said devices

being adjacent each side of the interlocked portions of the sheets and means during operation to move both of said devices toward and from each other to engage and hold the interlocked portions for guiding them to and between said elements.

2. In a machine of the character described, the combination of a pair of elements for rolling down interlocked portions of metal sheets, and a pair of relatively movable devices for holding the sheets in assembled relationship while guiding them through and between said elements, and means for simultaneously moving said devices into engagement with the interlocked portions of the metal sheets.

3. In a machine of the character described, the combination of a pair of elements for rolling down interlocked portions of metal sheets, a pair of guiding devices arranged to engage opposite edges of the sheets, levers disposed at one side of said rolling down elements for supporting said devices in operative relation thereto, and means for operating said levers, whereby said devices co-act to guide the metal sheets to said rolling down elements.

4. In a machine of the character described, the combination of a pair of elements having their axes in a common plane for rolling down interlocking portions of metal sheets, means for adjustably supporting one of said elements, and a pair of guiding devices mounted for movement during operation toward and from said interlocking portions of the sheets with the axes of said guiding devices in a fixed plane parallel to the plane of the axes of said elements for holding the sheets in assembled relationship while guiding them to and between said elements, one of said guiding devices being supported on said adjustable supporting means.

5. In a machine of the character described, the combination of a pair of elements having their axes in a common plane for rolling down interlocking portions of metal sheets, means for adjustably supporting one of said elements, a pair of devices each movable during operation relative to each other transversely of the sheets and in advance of their travel to the rolling down elements for holding the sheets in assembled relationship while guiding them to and between said elements, one of said devices being supported on said adjustable supporting means, and means for rotating one of said rolling down elements.

6. In a machine of the character described, the combination of a pair of elements having their axes in a common plane for rolling down interlocking portions of metal sheets, a pair of devices for engaging the interlocked portions to hold them in assembled relationship, said devices co-operating with said elements to support the interlocking portions while guiding them to and between said elements, means for supporting said devices to move toward and from each other in a direction parallel to the plane of the axes of said elements and in front thereof, and means for adjusting one of said devices on its supporting means.

7. In a machine of the character described, the combination of a frame, a member adjustably supported on said frame, a pair of elements carried by said frame and member for rolling down interlocking portions of metal sheets, a pair of devices for holding the sheets in assembled relationship while guiding them to and between said elements, one of said devices being movable with the adjustable member, and means for moving said devices toward and from each other.

8. A machine as claimed in claim 7 in which the moving means operates the guiding devices in a plane transverse to the direction of movement of the metal sheets.

9. In a machine of the character described, the combination of a pair of elements for rolling together interlocking portions of sheets of metal, devices for engaging the interlocking portions at their opposite sides, to hold the sheets in assembled relationship while guiding them to said elements, and means for movably supporting said devices to move toward and from each other in a plane transverse to the plane of movement of the sheets of metal, whereby they may be separated to permit the positioning of the metal sheets and operated for the purposes set forth, and connections between the supporting means for said devices for operating them in either direction simultaneously.

10. A machine as claimed in claim 9 in which the guiding devices comprise loosely mounted rollers.

11. In a machine of the character described, the combination of a pair of elements for rolling together interlocking portions of sheets of metal, devices for engaging the interlocking portions at their opposite sides, to hold the sheets in assembled relationship, while guiding them to said elements, means for supporting said devices to move in a plane transverse to the plane of movement of the sheets of metal, whereby they may be separated to permit the position of the metal sheets and operated for the purposes set forth, and a set of connected devices, arranged to operate said holding devices simultaneously toward or from each other.

12. In a machine of the character described, the combination of a pair of elements for rolling down interlocking portions of metal sheets, means for rotating one of said elements, a pair of loosely mounted rollers for engaging the interlocking portions at their opposite sides to hold the

sheets in assembled relationship while guiding them to said elements, means for supporting said devices to move in a plane transverse to the plane of movement of the metal sheets, whereby they may be separated to permit the positioning of the metal sheets, and operated for the purposes set forth, and means for adjusting one of said elements and the adjacent holding device relative to the other element and holding device, respectively.

13. In apparatus of the character described the combination of a pair of metal rolling elements, a pair of levers, a pair of guide devices mounted on the free ends of said levers and arranged to engage the opposite edges of metal sections to be rolled by said rolling elements and guide them thereto, and means for operating said levers to move said devices toward each other and maintain them in engagement with the metal sections, whereby said devices co-act to guide the metal sections.

14. In a machine of the character described, the combination of a pair of elements for rolling down or seaming interlocking portions of metal sheets, a pair of levers, devices mounted on said levers for holding and guiding the interlocked sheets to said elements, and means for simultaneously operating said levers.

15. In a machine of the character described, the combination of a pair of rolls mounted on parallel shafts for co-action to roll or seam interlocking portions of metal sheets, a pair of guide members for guiding the interlocked sheets in a direction substantially at right angles to the axes of said rolls, said guide members being movable toward and from each other in planes at substantially right angles to the movement of the metal sheets, and means for simultaneously moving said guide members toward each other and maintaining them in co-operative relation to guide the metal sheets.

16. A pair of opposing seaming rolls, a pair of guides each movable transversely of the material fed to the rolls, and means for thrusting the guides toward each other to bring the two edges of the material to be seamed into position for feeding between the seaming rolls from said guides, said guides co-operating with said rolls to support the material while guiding it to said rolls.

17. A pair of opposing seaming rolls, a pair of rotatable guides disposed upon opposite sides of the sheet material having the two edges to be seamed together, said guides each being movable toward and from opposite sides of the material in front of said rolls, and means for thrusting the guides into position for directing the said edges between the seaming rolls, said guides co-operating with said rolls to support the material while guiding it to said rolls.

18. A pair of opposing seaming rolls, a pair of opposite shrouded guide rollers upon opposite sides of the sheet material having the edges to be united, said guides each being movable toward and from opposite sides of the material in front of said rolls, and means for thrusting the rollers into position for directing the said edges between the seaming rolls, said guides co-operating with said rolls to support the material while guiding it to said rolls.

19. A guide mechanism for sheet material seaming rolls embodying a manually controlled member, a pair of guides oppositely of the material as directed to the seaming rolls, and connections from the member to effect shifting of both guides simultaneously into material directing position.

In testimony whereof, I have hereunto subscribed my name.

CARL M. YODER.